



# SESAR JOINT UNDERTAKING

## Single Programming Document 2018-2020

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### Abstract

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This document is the Single Programming Document of the SESAR Joint Undertaking for the period 2018-2020, as amended on 12/02/2018 (annex to Administrative Board Decision No ADB(D)04-2018).

It provides multi-annual (2018 to 2020) and annual (2018) programming components and forms the multi-annual and annual work programmes of the SESAR JU. Once adopted, this Single Programming Document will replace the Single Programming Document 2017-2019 insofar as it refers to the years 2018 and 2019.

**FINAL DOCUMENT**

Founding Members



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## Foreword

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The SESAR Joint Undertaking (SJU) is a key enabling organisation for the modernisation of European and global air traffic management (ATM), coordinating and concentrating of all ATM-related research and innovation (R&I) efforts in the EU.

Since its establishment in 2007, the SJU, together with its Members and partners, has provided a significant return on the original EU investment, delivering high-performing solutions in accordance with the European ATM Master Plan and its performance ambition, stimulating growth across the aviation sector, generating employment and other tangible societal benefits.

By successfully implementing the SESAR 2020 programme, the SJU will continue to provide the most efficient way of implementing research and innovation for Europe, will further contribute to the delivery of the Single European Sky (SES) and the broader EU Aviation Strategy, and will provide investors with a sound return on investment.

The SJU's Single Programming Document for 2018–2020 builds upon previous successes and outlines the ongoing roadmap to the successful implementation of SESAR 2020 over the next three years. This document describes six strategic areas of operation that the SJU will pursue during the reporting period for that purpose.

While delivering these strategic objectives, the SJU will remain committed to strengthening its effective and efficient organisation by continually improving its processes, procedures, performance & risk management, ICT infrastructure, and investing in its talented people.

Florian Guillermet

Executive Director

SESAR Joint Undertaking

## Document history

Edition	Date	Status	Justification
Edition 1	31/01/2017	Draft	Initial version submitted to Authority
Edition 1.1	19/10/2017	Draft	Final Draft version submitted to the Administrative Board for review in view of adoption, incorporating the following changes: <ol style="list-style-type: none"> <li>Updated Calls sequence and timeline, in section II chapter 2 and in section III</li> <li>Final Draft Budget for 2018, integrating the results of the 2017 Amendment 1 Budget</li> <li>Updated Staff Establishment Plan, aligned with the SPD 2017 Amendment 1</li> <li>Update to section II chapter 2.2, section III chapter 2.1 and Appendix IX to reflect the mandate received by the SESAR JU from the Commission to develop a proposal for the future architecture of the European airspace, and to support the financing decision required for the launch of this procurement action</li> <li>Inclusion of information on the new U-Space Call for proposals in section II chapter 2.5, section III chapter 2.4 and 2.6 to support the financing decision required for the launch of this Call</li> </ol>
Edition 1.3	24/11/2017	Final draft for adoption	<ol style="list-style-type: none"> <li>Clarification of the SESAR 2020 Programme governance in section II paragraph 2.1.5</li> <li>Final Budget for 2018, integrating the results of the 2017 Amendment 2 Budget</li> <li>Inclusion of information on the new U-Space Call in section III chapter 2.4 and 2.6 to support the financing decision required for the launch of this Call for proposal</li> <li>Overall update of Appendix IX to reflect the latest plan for procurement actions to be carried out in 2018</li> </ol>
Edition 1.4	14/12/2017	Adopted	Inclusion of last comments from European Commission Adoption by the Administrative Board
Edition 1.5	01/02/2018	Under Review	Proposed first amendment to the 2018 Budget to re-mobilise unused 2017 appropriations: <ol style="list-style-type: none"> <li>Update of section II paragraph 3.2.2.2 Budget 2018 figures (tables 13 and 14)</li> <li>Update of section III paragraph 3.1</li> <li>Update of Annexes I and II</li> </ol>
Edition 2.0	12/02/2018	Adopted	Adoption of the first amended version by the Administrative Board

## List of Acronyms

Acronym	Long Name / Definition
4 D	4 Dimensions
ABAC	Accrual Based Accounting
ACAS	Airborne Collision Avoidance System
A-CCD	Advanced Continuous Climb Departure
A-CDA	Advanced Continuous Descent Approach
ADS-B	Automatic Dependence Surveillance-Broadcast
ADS-C	Automatic Dependence Surveillance-Contract
ADEXP	ATS Data Exchange Presentation
AeroMacs	Aeronautical Mobile Airport Communications System
AFUA/ASM	Advanced Flexible Use Airspace/Airspace Management
AIM	Aeronautical Information Management
AMAN	Arrival Manager
AOC	Airlines Operational Communication
AOP	Airport Operation Plan
ASAS	Airborne Separation Assistance System
ASPA	Airborne Spacing
ATC	Air Traffic Control
ATM	Air Traffic Management
ATSA ITP	Air Traffic Situation Awareness- In-Trail Procedure
AU	Airspace Users (Civil)
CA	Contract Agent
CCD	Continuous Climb Departure
CDA	Continuous Descent Approach
CDM	Collaborative Decision Making
CNS	Communication, Navigation, Surveillance

Acronym	Long Name / Definition
CTA	Controlled Time Arrival
CWP	Controller Working Position
DART	Data-driven Aircraft Trajectory
DCB	Demand and Capacity Balancing
DCMAC	Directorate Civil Military ATM Coordination (part of EUROCONTROL)
DMAN	Departure Manager
EGNOS	European Geostationary Navigation Overlay Service
EOCVM	European Operational Concept Validation Methodology
EPP	Extended Projected Profile
ER	Exploratory Research
EU	European Union
FCI	Future Communication Infrastructure
Flightpath 2050	Report of the High Level Group (HLG) on Aviation and Aeronautics Research established by the European Commission in December 2010, setting out a new vision for the aviation sector by 2050
GA	General Aviation
GA/R	General Aviation & Rotorcraft
GANP	Global Air Navigation Plan (from ICAO)
GBAS	Ground Based Augmentation System
GNSS	Global Navigation Satellite System
H2020	Horizon 2020 Framework Programme
HMI	Human Machine Interface
I 4D	Initial 4 Dimensions
IBA	Identified beneficiary action
ICAO	International Civil Aviation Organisation
IFR	Instrument Flight Rules
IOP	Inter-operability

Acronym	Long Name / Definition
IR	Industrial Research & Validation
LVC	Low Visibility Conditions
LVP	Low Visibility Procedure
Members	2 Founding Members (the European Union and EUROCONTROL) and 19 stakeholder Members of which all apart from the EU are signatory to a Membership Agreement or Accession Agreement
MSP	Multi Sector Planning
NOP	Network Operation Plan
OAT	Operational Air Traffic
P-RNAV	Precision Area Navigation
R&I	Research & Innovation
RNP	Required Navigation Performance
RPAS	Remotely Piloted Aircraft System
RSP	Required Surveillance Performance
RTS	Real Time Simulation
S&M	Sequencing & Merging
SBT/RBT	Shared Business Trajectory/Reference Business Trajectory
SES	Single European Sky
SESAR	Single European Sky ATM Research
SESAR 2020	The SESAR 2020 research and innovation programme, also referred to as the SESAR 2020 Programme or SESAR 2020 R&I programme  It is the coordinated set of activities described in this document and being undertaken by the Members and managed by the SESAR JU
SJU	SESAR Joint Undertaking
SNE	Seconded National Expert
STAM	Short Term ATFCM Measures
STCA	Short Term Conflict Alert
SWIM	System Wide Information Management



Acronym	Long Name / Definition
SWIM-TI	System Wide Information Management Technical Infrastructure
TA	Temporary Agent
TMA	Terminal Manoeuvring Area
TRL	Technology Readiness Level
TTA	Target Time Arrival
UAS	Unmanned Aerial System
UDPP	User Driven Prioritisation Process
UTM	UAS Traffic Management
VLD	Very Large-Scale Demonstration
VLL	Very Low-Level

**Table 1: List of acronyms**

## Mission Statement

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The mission of the SESAR Joint Undertaking (SESAR JU), created under Article 171 of the Treaty establishing the European Union, is to develop a modernised air traffic management system for Europe, which will prevent crippling congestion of the European sky and reduce the environmental impact of air transport. Established in 2007 as a joint undertaking<sup>1</sup>, the SESAR JU is responsible for the modernisation of the European air traffic management (ATM) system by coordinating and concentrating all ATM relevant research and innovation efforts in the EU to develop the next generation air traffic management system capable of ensuring the safety and fluidity of air transport worldwide over the next thirty years. The SESAR JU is also responsible for ensuring international collaboration on ATM modernisation, under the principles established by the European Union.

Founded by the European Union and EUROCONTROL, the SESAR JU became in 2009 a Community Body. It was augmented by 15 stakeholder Members and then in 2016 a further 4 members acceded to membership, all committing to further achieve the mission of the Joint Undertaking to 2024. Together with their partners and affiliate associations, the Members represent over 100 organisations from across the ATM community, from civil and military air navigation service providers, to airports, civil and military airspace users, staff associations, academia and research centres. Through these partnerships and further collaboration with staff associations, regulators and the larger scientific community, the SESAR JU unites the skills of some 3.000+ experts to fast-track research leading to change in European ATM in accordance with a Master Plan, aligned with the EU Aviation Strategy and in accordance with the SES Regulation.

As an integral part of the SESAR (Single European Sky ATM Research) project, the SESAR JU is the technological pillar of the Single European Sky (SES) policy and contributes to the SES targets by defining, developing and validating innovative technological and operational solutions for managing air traffic in a more efficient manner. With a first budget of EUR 2,1 billion of which EUR 700 million from the EU<sup>2</sup> (up to 2016) and then an additional ca. EUR 1,6 billion of which EUR 596,3 million from the EU<sup>3</sup> (up to 2024), the SESAR JU has established a contiguous research ‘pipeline to innovation’, comprising of three distinct strands of activities with the aim to see a flow of research and innovation activities meeting stakeholder needs and citizen expectations: Exploratory Research, Industrial Research & Validation, and Very Large-Scale Demonstrations. These activities are carried out in line

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<sup>1</sup> The SESAR Joint Undertaking (SJU) was established under Council Regulation (EC) 219/2007 of 27 February 2007 (as modified by Council Regulation (EC) 1361 / 2008 (SJU Regulation) and last amended by the Council Regulation (EU) 721/2014)

<sup>2</sup> The EU contribution of EUR 700 million up to 2016 was established for EUR 350 million under FP7 (the 7<sup>th</sup> EU Framework Programme for Research and Innovation) and TEN-T (the EU programme for the upgrade of transport infrastructure)

<sup>3</sup> The EU contribution of EUR 585 million up to 2024 is established under the Horizon 2020 programme. In addition, following the delegation agreement EC/SESAR JU ref. MOVE/E3/DA/2016-669/SI2.743803 signed on 06/12/2016, SESAR JU has been entrusted in 2016 the implementation of an action ‘Integrating remotely piloted aircraft systems (RPAS) in European airspace with and active geofencing service (AGS)’ and received EUR 500 000 on budget line 06.027712 (see section II paragraph 3.2.1)

Furthermore, the SJU has been mandated by the Commission to procure a study to develop a proposal for the future architecture of the European airspace (delegation agreement EC/SESAR JU ref. MOVE/E3/DA/2017-477/SI2.766828 signed on 10/11/2017), with a delegated budget of EUR 800 000

The Commission has given an additional mandate to the SJU to organise U-space demonstrations, through delegation agreement EC/SESAR JU ref. MOVE/E3/DA/2017-564/si2.771010 signed on 13/12/2016 with a delegated budget of EUR 10 million from the Connecting Europe Facility (CEF) fund

with the European ATM Master Plan – the main planning tool for ATM modernisation in Europe – which the SESAR JU is responsible for maintaining.



The SESAR JU is linked to the Commission’s Mobility and Transport policy and makes a positive contribution towards the mission expressed in terms of Decarbonisation, Digitalisation, Investment and People objectives.

In addition, the SESAR JU operates in close coordination with other European organisations with direct links to the SESAR Project, including EASA and the SESAR Deployment Manager.

## Section I – General Context

### 1 High-level policy objectives: achieving the Single European Sky

In December 2015, the publication of “An Aviation Strategy for Europe”<sup>4</sup> provided additional focus and momentum towards completion of the Single European Sky (SES) to generate growth for European business, foster innovation and let passengers profit from safer, cleaner and cheaper flights, while offering more connections. The Strategy contributes directly to the Commission priorities of Jobs and Growth, Digital Single Market, Energy Union and the EU as a global actor with the published strategy containing many explicit references to the SESAR project and to the SESAR JU.

The Aviation Strategy poses challenges and enablers as represented in the figure below.



Figure 1: Key infographics from “An Aviation Strategy”

In this framework, the SESAR JU acknowledges the objectives for the modernisation of ATM. To this end, SESAR also remains a flagship project identified within the EC’s ‘Flightpath 2050’, a roadmap for the provision of a clean, competitive, safe and secure European aviation industry. SESAR’s positive contribution to meeting the needs of citizens, markets and to maintaining a competitive advantage for Europe is key to the continued successful evolution of ATM.

Within the Single European Sky (SES) legislative framework, the SJU contributes to achieving the SES High-Level Goals, namely to:

<sup>4</sup> <http://ec.europa.eu/transport/modes/air/aviation-strategy>

- Enable a three-fold increase in capacity which will also reduce delays both on the ground and in the air;
- Improve safety by a factor of 10;
- Enable a 10 % reduction in the environmental impact of flights;
- Reduce the cost per flight by 50 %.

The SESAR JU transfers the result of its ATM Research and Innovation activities in the form of SESAR Solutions that are made available for deployment, and therefore makes a positive contribution towards the achievement of the Single European Sky as well as the wider ambition of FlightPath2050 and the Aviation Strategy.

## 2 Drivers shaping the European aviation landscape: targets for ATM

Aviation, in particular Air Transport supported by air traffic management (ATM), is a key driver of EU economic growth, jobs and trade, and essential for the life and mobility of its citizens. However, the current ATM system is highly fragmented and largely reliant on ageing technology, leading to inefficiencies of EUR 4 billion annually. The role of the SESAR JU, in steering the SESAR R&I programme, is to define and develop solutions that meet what is needed and build a more connected, greener, safer ATM system as well as ensuring this is standardised as needed and made globally interoperable.

This work is undertaken through the SESAR R&I programme (called “the SESAR 2020 Programme” for the period covering 2015 to 2021), coordinated by the SESAR JU and performed by the industry at large. The activities performed by the industry are funded through the Horizon 2020 Framework Programme (H2020) mostly, which means that the SESAR JU operates in accordance with H2020 rules and processes, adapted for use by partnerships, for all its activities related to award and management of these grants. The SJU is also granted additional tasks by the European Commission under a variety of legislative frameworks; all the activities are integrated into the SESAR 2020 Programme.

Besides the role of technology and innovation, the EU Aviation Strategy also recognises the need to secure Europe’s leading role in international aviation. To this end the SESAR JU also works closely with the European Commission and EUROCONTROL on building and executing a coordinated plan of action involving third countries and the international aviation body ICAO.

The challenges for ATM are captured and maintained in a European ATM Master Plan (currently 2015 Edition<sup>5</sup>) – this forming the main planning tool for ATM modernisation in Europe. Some of these challenges and solutions are described below.

The **number of flights has increased** by 80% between 1990 and 2014, and is forecast to grow by a further 45% between 2014 and 2035. Although slower than previously expected, the increase of traffic will still place pressure on an already congested network which is facing saturation. The situation calls for the introduction of additional automated tools and revised data communications

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<sup>5</sup> The European ATM Master Plan will have a new edition in 2018 – see section II paragraph 2.2.1 and section III paragraph 2.1.3

that enable improved ANS operations productivity, thereby handling more traffic in a safer way. Airports are also reaching saturation with this growth and require solutions to help maximise their capacity in all weather conditions, such as satellite-based tools for accurate navigation and landing (e.g. Galileo and EGNOS whose adoption can be further accelerated).

The **European economic recovery remains slow**, which challenges the aviation and ATM industries to increase their productivity, sustainability and competitive edge. Technology and innovation are key enablers, allowing for medium-term development of leaner and more modular systems that are easier to upgrade and more interoperable with each other. Virtualised control centres and use of remote towers will also allow for a more efficient and flexible use of resources, substantially improving the cost efficiency of service provision and relieving congested airspace.

**Drones** are rapidly changing the landscape of aviation and this change is happening at a speed and scale that has never been seen before. Clear standards and low-cost system solutions which support interoperability will allow the integration of drones alongside other airspace user in an efficient manner, while also ensuring safety and security (e.g. via geofencing, where EGNOS/Galileo specific services can bring added value).

**Increased connectivity and digital information exchange in ATM** can also increase the risk of cyber-attacks. This requires innovative solutions to protect critical information systems and to ensure that secure data exchanges allow stakeholders to collaborate effectively and reliably.

## Section II – Multi-Annual Programming 2018 – 2020

This section aims to provide stakeholders with a general overview of the activities planned by the SESAR Joint Undertaking (SJU) in order to fully execute its mandate and deliver its long-term strategy. It is structured around the multi-annual objectives for the period 2018 - 2020 that reflect the mandate of the SJU and its priorities. This section is updated on an annual basis as a rolling plan, giving due consideration of the EU framework within which the SJU is operating.

### 1 Multi-annual objectives

#### 1.1 The SESAR innovation pipeline

The second SESAR R&I programme (SESAR 2020) is structured in three main research and innovation phases that aim to deliver a pipeline of innovation, which matures operational and technology solutions through the EOCVM (European Operational Concept Validation Methodology) well-established control and monitoring process linked to Technology Readiness Level (TRL). This pipeline starts with SES objectives which feed into the European ATM Master Plan, the main planning tool defining the ATM modernisation roadmap and priorities maintained and updated on a regular basis. Exploratory Research (ER) addresses both transversal topics for future ATM evolution and application-oriented research. According to the four Key Features defined in the Master Plan, it is then expanded with contribution from the SJU Members that undertake Industrial Research and Validation (IR) and then further exploits the benefits of the partnership in demonstrating on a large scale the concepts and technologies in representative environments (VLD for Very Large-Scale Demonstration activities). In some cases, for instance where technology is mature in sectors other than ATM, fast-track integration from Application-Oriented Research to Demonstration activities is possible. This will ultimately deliver results in the form of SESAR Solutions that will contribute to firmly establishing the performance benefits in preparation for deployment.

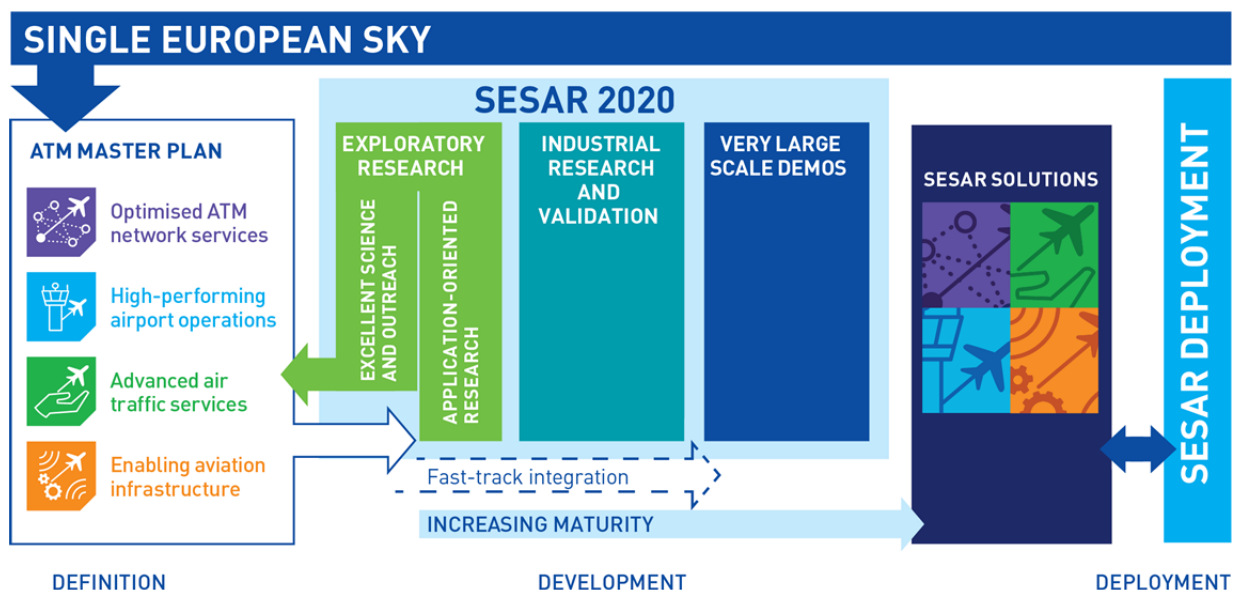


Figure 2: SESAR's innovation pipeline – from SES to SESAR Solutions



## 1.2 The four SESAR Key Features

In the European ATM Master Plan, SESAR Solutions have been categorised according to four key areas of ATM (Key Features), which form a coherent way to present the solutions over the time span of the multi-annual work programme and across all of ATM in Europe as explained in section II chapter 2 and in section III of this document:

### High-performing airport operations



The future European ATM system relies on the full integration of airports as nodes into the network. This implies enhanced airport operations, ensuring a seamless process through collaborative decision-making (CDM), in normal conditions, and through the further development of collaborative recovery procedures in adverse conditions. In this context, this Feature addresses the enhancement of runway throughput, integrated surface management, airport safety nets and total airport management.

### Advanced air traffic services



The future European ATM system will be characterised by advanced service provision, underpinned by the development of automation tools to support controllers in routine tasks. The Feature reflects this move towards further automation with activities addressing enhanced arrivals and departures, separation management, enhanced air and ground safety nets and trajectory and performance-based free routing.

### Optimised ATM network services



An optimised ATM network must be robust and resilient to a whole range of disruptions, including meteorological and unplanned events relying on a dynamic and collaborative mechanism. This will allow for a common, updated, consistent and accurate plan that provides reference information to all planning and executing ATM actors. This Feature includes activities in the areas of advanced airspace management, advanced dynamic capacity balancing (DCB) and optimised airspace user operations, as well as optimised ATM network management through a fully integrated network operations plan (NOP) and airport operations plans (AOPs) via system-wide information management (SWIM).

### Enabling aviation infrastructure



The enhancements described in the first three Key Features will be underpinned by an advanced, integrated and rationalised aviation infrastructure, providing the required technical capabilities in a resource-efficient manner. This feature will rely on enhanced integration and interfacing between aircraft and ground systems, communications, navigation and surveillance (CNS) systems, SWIM, trajectory management and Common Support Services. Furthermore, the safe integration of drones in all categories of airspace and the development of U-space is a new policy priority which is reflected in the dedicated addendum to the Master Plan delivered in 2017 and in a dedicated Call for proposals to be launched in 2018 (see paragraph 2.5 below and section III paragraph 2.6.1.2).



### 1.3 The European Master Plan performance framework

The SJU results in the period 2018 – 2020 will continue to contribute to the achievement of the Single European Sky and the European ATM Master Plan vision and ambition across the six main performance areas that are illustrated below.



Figure 3: Six performance areas of the Single European Sky

The realisation of the SESAR vision will not only bring significant direct and quantifiable performance gains to ATM, air transport and aviation, but is expected also to deliver wider benefits for the EU economy and society in general. It is estimated that cost savings and the value of all performance benefits would amount to annual recurring benefits ranging from EUR 8 billion to EUR 15 billion per year in 2035 (source: European ATM Master Plan, edition 2015), compared to a baseline where SESAR would not be deployed.

### 1.4 SESAR delivery: Upgrade phases of the European ATM system

The delivery of these results in the form of SESAR Solutions as defined above in paragraph 1.1 will contribute to the various phases of upgrade of the Air Traffic Management system as outlined in the Master Plan, which are depicted in the figure below:

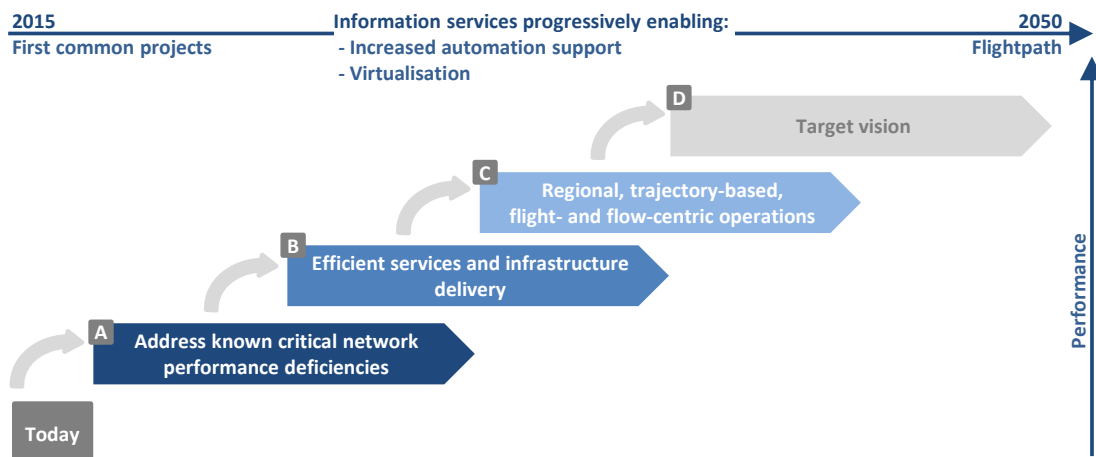


Figure 4: European ATM system upgrade phases as per ATM Master Plan

From 2018 to 2020, the primary objective of the SESAR Solutions delivered will be to contribute to phases A & B, while preparing the ground for those Solutions that will be further developed in the next period and that will target more specifically Phase C. As for the Exploratory Research activities conducted through the grants awarded in 2016 (see below), they will primarily contribute to the further maturation of the scientific and technical challenges of the SESAR Target Vision (phase D).

## 2 Multi-annual programme

### 2.1 Introduction

The SJU's multi-annual programme aims for the continued effective delivery of the SESAR 2020 R&I programme. As outlined in the SJU's multi-annual work programme (MAWP) adopted by the SJU Administrative Board in July 2015, the SESAR 2020 Programme has been designed to encourage the implementation of the SESAR innovation pipeline outlined in chapter 1.1.

In this chapter, information is provided on the Strategic Areas of Operation according to which the SJU multi-annual work programme is established. In the following paragraphs, each Strategic Area of Operation is then described in its activities, source and structure of funding and governance.

#### 2.1.1 Six Strategic Areas of Operation

The six Strategic Areas of Operation constitute each a strategic objective of the SESAR JU documented in the multi-annual work programme, and as such to be followed in the period from 2018 to 2020:

- Strategic Area of Operation **#1 – Provide Strategic Steering to the SESAR programme**: the SJU will continue to provide strategic steering to the SESAR R&I programme in particular through the link with the SES policy framework and the maintenance of the European ATM Master Plan, and the provision of guidance on the SESAR concept, architecture and performance. This strategic area of operation is further presented in chapter 2.2 and in section III chapter 2.1;
- Strategic Area of Operation **#2 – Deliver Exploratory Research**: within the pipeline for innovation (see figure 2 in paragraph 1.1 above), the first phase concerns Exploratory Research (ER), further categorised into those elements/projects dealing with relevant fundamental scientific subjects (Excellent Science & Outreach) and those which investigate the initial applications of such science for the ATM sector (Application-oriented research). This strategic area of operation is further presented in chapter 2.3 and in section III chapter 2.2;
- Strategic Area of Operation **#3 – Deliver Industrial Research & Validation**: the second phase of the pipeline for innovation is the Industrial Research and Validation (IR) which includes applied research, pre-industrial development and validation projects and is delivered by the Members of the SJU. This phase is further split into two waves:
  - Wave 1 covering the period 2016-2019 and Wave 2 (launched in 2019) to cover the period 2019-2021;
  - It is dependent upon the progressive delivery of a number of specific operational or technical improvements – SESAR Solutions – which are systematically validated in order to have conclusive evidence to support a decision for their individual implementation and/or synchronised deployment.

This strategic area of operation is further presented in chapter 2.4 and in section III chapter 2.3;

- Strategic Area of Operation **#4 – Deliver Very Large-Scale Demonstration activities**: the third phase of the pipeline for innovation deals with Very Large-Scale Demonstrations (VLDs) which are designed as demonstrations of particular programme concept elements and SESAR Solutions. These demonstrations provide the bridge between the development and deployment phases of SESAR and are delivered through work undertaken by SJU Members, supplemented by open Calls for proposals to ensure the widest possible stakeholder participation.
  - In some cases, results of Application-oriented Exploratory Research can be passed to the third phase ‘VLD activities’ directly; this is in particular the case when a technology is mature in sectors other than ATM and when the focus is more on the adaptation of that mature technology for ATM than on developing the technology (for instance activities related to U-space in the annual work programme section).

This strategic area of operation is further presented in chapter 2.5 and in section III chapter 2.4;

- Strategic Area of Operation **#5 – Deliver SESAR Outreach**: in addition to the continued steering and delivery of the ATM Master Plan and SESAR Solutions, the SJU ensures global outreach of the results achieved in the SESAR 2020 Programme, in full coordination with the European Commission and EUROCONTROL. This strategic area of operation is described in chapter 2.6 below and in section III chapter 2.5;
- Strategic Area of Operation **#6 – Deliver effective financial, administrative and corporate management**: the SJU must ensure it operates fully in accordance with its obligations, while also striving to continually improve its financial, administrative and corporate management as these elements of the SJU’s operations remain integral to the delivery of its mission and values. This area is outlined in further detail in chapter 2.7 below and in section III chapter 2.6.

### 2.1.2 Research topics to be addressed within the “innovation pipeline”

Within the “innovation pipeline”, the activities of the SJU and its Members as well as other Programme participants are designed to cover the full spectrum of the research topics to be addressed by the SESAR 2020 programme, which, in its current state, is depicted in the following figure. Based on the initial description established as part of the SESAR 2020 Multi-Annual Work Programme (MAWP) in 2015<sup>6</sup>, the SJU is maintaining this structure continuously. It is expected that the ATM Master Plan maintenance, and in particular the Master Plan update campaign that will be carried out in 2018, as well as the definition of the ER4, IR/VLD Wave 2 and VLD Open 2 Calls (see section III paragraph 2.1) might result in refinements of the structure of research topics.

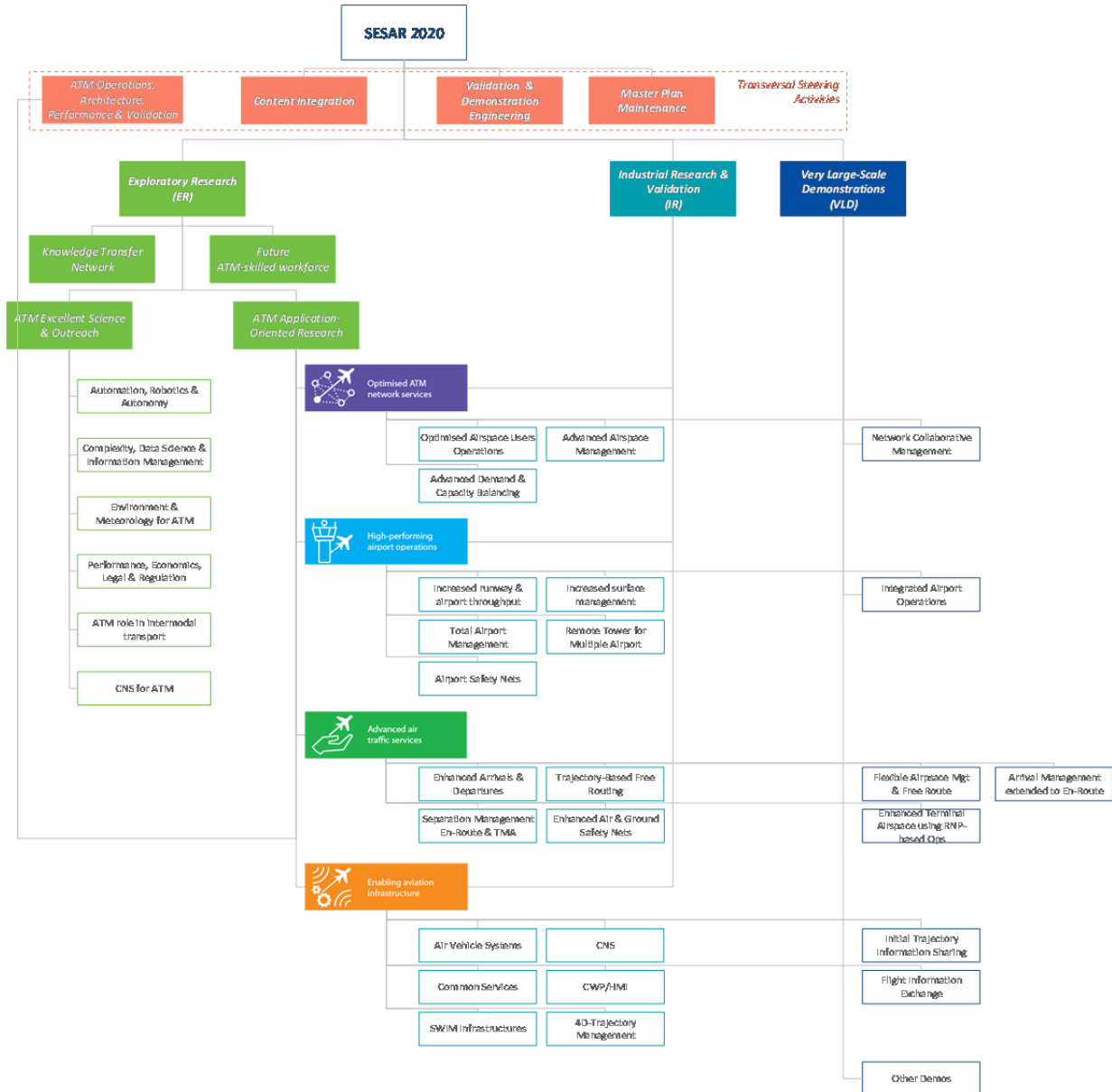


Figure 5: Structure of research topics covered by the SESAR 2020 programme (at the end of 2017)

<sup>6</sup> The Multi-Annual Work Programme was adopted by the Administrative Board in 2015 (decision [ADB\(D\)-05-2015](#))

### 2.1.3 Funding the “innovation pipeline”

The three phases of the pipeline and the steering of the programme will be delivered using a range of instruments fully compliant with existing EU framework programmes (namely, the Horizon2020 and Connecting Europe Facility framework programmes): Exploratory Research and part of the Very Large Scale Demonstrations being secured using open Calls for proposals, and the Industrial Research & Validation and remaining part of Very Large Scale Demonstration using Calls restricted to Members of the SJU.

The relationship between the various programme phases of the SESAR 2020 programme and the various Call activities is outlined in the following figure and is further detailed in paragraphs 2.2 to 2.4 of this section.

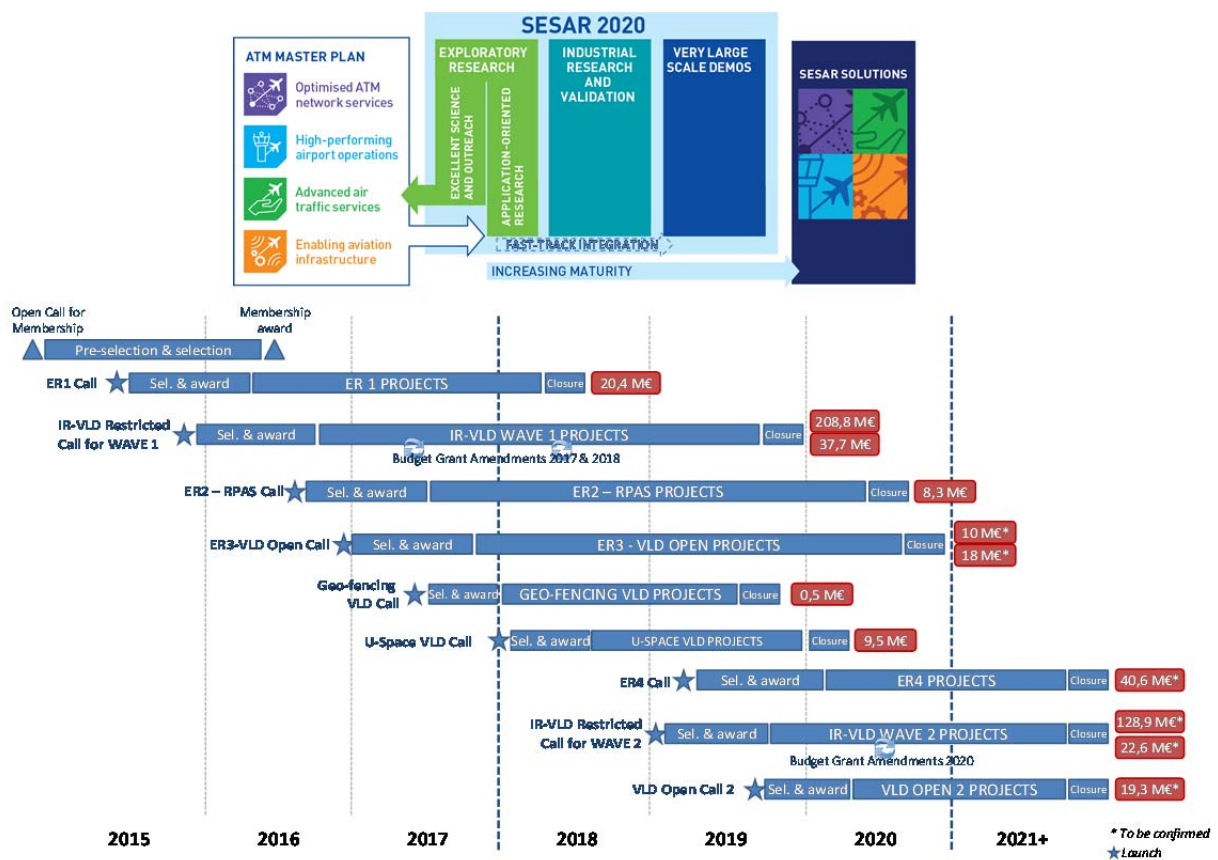


Figure 6: Call activities of the SESAR 2020 programme over the period 2015-2021

In addition to the Calls for proposals listed above, the SJU undertakes studies in relation with technical topics relevant for the technological pillar of the SES. Out of these, the list of procurement actions related to studies to be undertaken in 2018 appears in the Annex IX “Procurement plan for 2018”.

### 2.1.4 Overview of the SESAR 2020 Programme Work Breakdown Structure at end 2017

As a result of the Calls for proposals already completed at the end of 2017, the SESAR 2020 Programme is composed of the following 61 projects<sup>7</sup> which implement the research topics presented in paragraph 2.1.2 (figure 5): topics of the Exploratory Research are covered by several projects, while in general topics of the IR and VLD are covered by one project each.

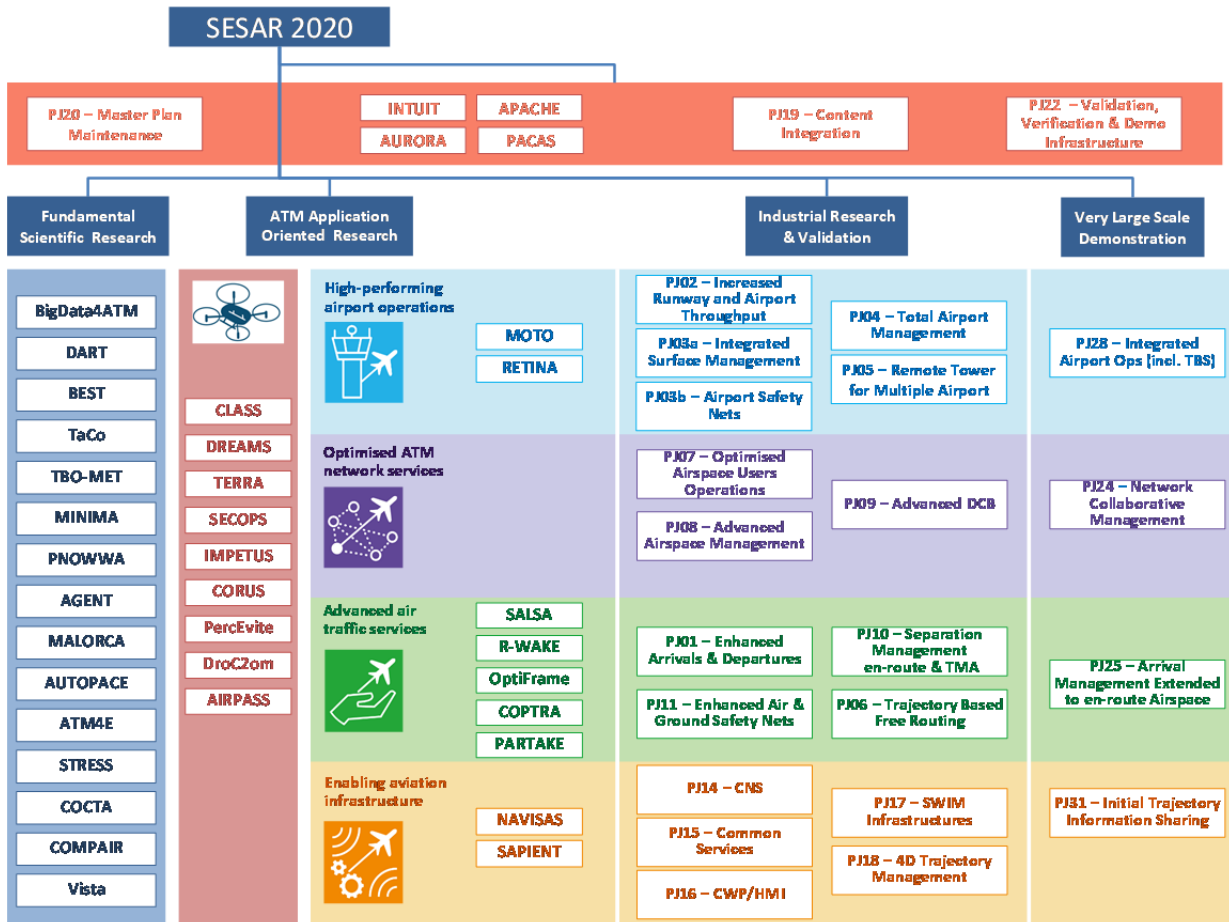


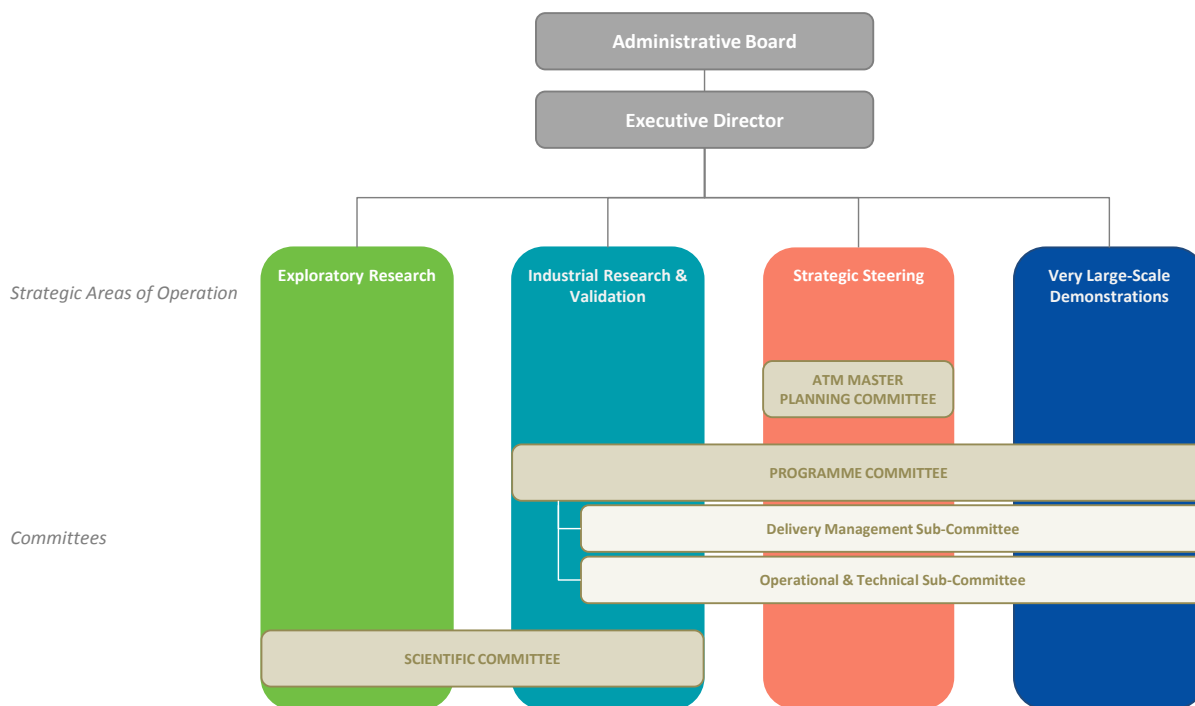
Figure 7: SESAR 2020 Programme Work Breakdown Structure as at the end of 2017

As can be seen in the figure above in relation to figure 5, at the end of 2017 most of the research topics of the SESAR 2020 Programme are covered by active projects. The approach to cover the remaining part of the topics is presented in section III chapters 2.1 and 2.4.

<sup>7</sup> Not counting last projects resulting from the ER3-Open VLD Call for which the grant agreement signature procedure has not been completed yet at the end of 2017

### 2.1.5 Governance of the SESAR 2020 Programme

The governance of the SESAR 2020 Programme can be depicted as follows:



**Figure 8: Governance of the SESAR 2020 Programme**

#### 2.1.5.1 Administrative Board

The Administrative Board (ADB) is the main governance body of SJU. It has overall responsibility for the strategic orientation and effective operation of the SJU and supervises the implementation of its activities in accordance with Article 5 of the Statutes. In accordance with the SJU Founding Regulation, the ADB is chaired by the European Commission, representing the EU, and constituted with a representative from each Member of the Joint Undertaking<sup>8</sup>, the Military, Civil Airspace Users, ANSPs, equipment manufacturers, Airports, ATM Staff and the scientific institutions/community.

#### 2.1.5.2 Programme Committee

The Programme Committee is composed of representatives of each of the stakeholders Members of the SJU including one representative of EUROCONTROL. In addition to this, there is one representative of civil Airspace Users and one of the European Commission (DG MOVE) as permanent observers. The secretariat and the chairmanship are performed by the SJU.

By representing their organisations, the PC stakeholders Members and EUROCONTROL commit to implement decisions taken by the PC affecting the SESAR Programme on technical and contractual matters.

The Programme Committee will continue to support the SJU ED in the SESAR 2020 Programme delivery, covering the Industrial Research and Validation and VLD phases of the programme.

<sup>8</sup> The list of Members of the SJU appears in annex XI



It will be supported by two sub-committees: a Delivery Management sub-committee focusing on the management of the programme and of the various contributions, and an Operations and Technical sub-committee focusing on the content steering of the activities.

### **2.1.5.3 ATM Master Planning Committee**

This Committee is composed of representatives of the European Commission, EUROCONTROL, civil users of airspace, the EDA representing the military, air navigation service providers, equipment manufacturers, airports, professional staff organisations in the air traffic management sector, EASA, EUROCAE, the Network Manager and the Deployment Manager.

These representatives have been put forward to the ED by the relevant ADB Members for formal appointment to the Committee. The Committee will provide advice to the ED on the progress of the execution and the implementation of the European ATM Master Plan, and will monitor coherence between its three levels. In particular, it will monitor and identify potential gaps or opportunities for improving Master Plan priorities and advise the ED of measures they see are needed.

### **2.1.5.4 Scientific Committee**

The Scientific Committee supports the SJU Executive Director in assuring the scientific excellence of the SESAR 2020 Programme. In particular, this Committee will, under the chairmanship of the SJU, take a monitoring view (content and results) over the Exploratory Research activities of the SESAR 2020 Programme and transition to Industrial Research and Validation, while also providing the ED with scientific advice covering the whole range of SJU's SESAR 2020 research activities.

The committee member seats were filled by an open Call for scientists and researchers from across the research community and a representative from each of the Founding Members (EC on behalf of the EU and EUROCONTROL).

In order to foster transition between Exploratory Research and Industrial Research, an observer seat is reserved to a representative of the Programme Committee.



## 2.2 Strategic Area of Operation 1: Provide Strategic Steering to the SESAR programme

Under the leadership of the SESAR JU, all SESAR 2020 R&I activities are undertaken within a common framework. As introduced with the SESAR 2020 Programme research topics diagram (figure 5), this framework applicable to the industrial research and validation relies on the elements described below:

- Maintenance of the **European ATM Master Plan**,
- **Content Integration** activities aiming for transversal steering of the programme through the **Concept of Operations, Architecture activities, and the Performance framework**,
- **Validation and Demonstration engineering activities** aiming at the specification of long-term shared developments on the verification and validation infrastructures, as an enabler to validation activities..

In 2018 and 2019, in continuation with the activities carried out in 2016 and 2017, the execution of this framework will be supported by the following corresponding projects, as depicted in figure 7: PJ.20 ‘ATM Master Plan maintenance’, covering the maintenance of the ATM Master Plan, PJ.19 ‘Content integration’, covering the required coordination of IR projects to develop the concept of operations, architecture and performance, and alignment with the ATM Master Plan, and PJ.22 ‘Validation, Verification and Demonstration Infrastructure’, covering the maintenance of programme-wide Verification and Validation (V&V) infrastructure information. Furthermore, four projects of the Exploratory Research phase, related to ATM operations, Architecture, performance & Validation: PACAS, INTUIT, AURORA, APACHE. The high-level description of these projects and the related funding are outlined in paragraph 2.2.5.

For 2020, the execution of the Strategic Steering framework is dependent on the results of the Call IR/VLD Wave 2 (with reference H2020-IBA-SESAR-2019-1) which will take place in 2019 (see section III chapter 2.1 for the process related to the preparation and planning of this Call).

In addition to these projects, and in continuation with the work done in previous years, the SJU will carry out a variety of activities in the period from 2018 to 2020 to assist stakeholders in other areas related to the technological pillar of the Single European Sky. These are presented in paragraph 2.2.3.

The Strategic Steering projects work very closely with the SJU in order to provide an additional level of independence and external assistance to de-risk the delivery of SESAR Solutions. In this role, the SJU benefits from additional support from Airspace Users, Professional Staff Organisations and National Aviation Authorities (see paragraph 2.2.4).

### 2.2.1 ATM Master Plan maintenance

Within the framework of the Single European Sky (SES), the European ATM Master Plan is the main planning tool for defining SESAR, related modernisation priorities ensuring that the SESAR Concept of Operations (see below) becomes a reality. The Master Plan is an evolving roadmap building on SESAR results and solutions and a strong collaboration between all European ATM stakeholders going beyond the Members of the SJU. The Master Plan details not only a high-level view of what is needed to be done in order to deliver a high performing ATM system, but also explains why and by when. It therefore sets the framework for the development and deployment activities performed by the SESAR Project either by the Members of the SESAR Joint Undertaking using results of SESAR 2020 or the SESAR Deployment Manager in accordance with the Deployment Programme to ensure overall synchronisation, consistency and alignment.

The governance of the ATM Master Plan maintenance is ensured by the support provided to the SJU Executive Director by the ATM Master Plan Committee. This committee is composed of representatives of the European Commission, EUROCONTROL, the Network Manager, civil users of airspace, the military, air navigation service providers, ground equipment manufacturers, airborne equipment manufacturers, airports, professional staff organisations in the air traffic management sector, the SESAR Deployment Manager, EASA and EUROCAE. It provides advice to the SJU Executive Director on the progress of the execution and the implementation of the European ATM Master Plan, and monitors coherence between its three levels. In particular, it monitors and identifies potential gaps or opportunities for improving Master Plan priorities and advises the Executive Director of required measures.

Providing input to the ATM Master Plan Committee, the ATM Master Plan is maintained through project PJ.20, which is expected to deliver the following:

Transversal Deliverables	2018	2019	2020
Update of Master Plan Level 1	X		Will be determined in the context of the IR/VLD Wave 2 <sup>9</sup>
Update of Master Plan Level 2	X	Yearly update	
Update of Master Plan Level 3	X	Yearly update	
Update to Standardisation Roadmap	X	Yearly update	
Update to Regulatory Roadmap	X	Yearly update	
Consolidated Business Cases	X	Yearly update	

**Table 2: ATM Master Plan maintenance deliverables in 2018-2020**

Further information on the update of Master Plan Level 1, which will take place in 2018, is provided in section III chapter 2.1.

### 2.2.2 Content Integration and Transversal Programme Steering

**Concept of Operations and Architecture activities** ensure that the overall SESAR ambition level outlined in the European ATM Master Plan can be implemented by operational and technical teams working on the development activities with clear validation targets and targeted operation scenarios in mind. It is also at this level that the desired evolution of the high-level architecture is cross-checked with the results of the validation activities.

Delivered with the support of project PJ.19, Content Integration and Transversal Programme Steering activities include:

- The **SESAR Concept of Operations**: the goal of the SESAR “Concept of Operations” is to ensure that the SESAR 2020 concept is developed in a simple and implementable manner. The concept has been structured in several operational phases, which correspond to manageable, implementable and valuable collections of operational improvements that the ATM community can articulate and identify with. This introduces an incremental approach to

<sup>9</sup> Cf. section II chapter 2.4.1.2

concept development, validation and deployment, improving the likelihood of successful implementation.

- The **SESAR reference Architecture and Technical System Strategy**: the SESAR reference Architecture and Technical System Strategy defines the principles for the future ATM single European architecture, in support of setting a vision for ATM stakeholder decision makers and providing guidance for projects on system design and architectural issues. Similar to the Concept of Operations it foresees several so called “to-be” architectures that represent the target evolution of the European ATM system over time and derive from the baseline architecture evolution established in the first programme. Following the SESAR Reference Architecture, the various architecting activities within the SESAR Programme are consolidated and made consistent in the European ATM Architecture repository (EATMA),
- As the SESAR Project is driven by the **Performance Framework**, Business Case feasibility with a deployment focus, the overarching and transversal domains such as activities on Concept and Architecture are being conducted on a continuously iterative basis throughout the SESAR Project Lifecycle and feedback from Deployment experiences is necessary to ensure robustness.

**SESAR Solutions Packs** represent the **end result of the SESAR 2020 programme**: the SESAR Project Lifecycle of ATM Modernisation (Definition, Development and Deployment) represent all the activities for the definition and production of the deliverables and their grouping into SESAR Solutions.

The expected delivery of these transversal activities is the following:

Transversal Deliverables 2018-2020	2018	2019	2020
Concept of Operations	X		
Concept of Operations Update		X	
Validation Strategy Update		X	
Architecture Description Document	X	X	
ATM Information Reference Model	X	X	
ATM Information Reference Model Update 2		X	
Information Service Reference Model	X	X	
SESAR Lexicon	X	X	
Performance Framework	X		
Validation Targets	X		
Consolidated Performance Assessment and Gap Analysis	X		
EATMA guidance material and report	X	X	
EATMA Portal and model release notes	X	X	
Integrated Roadmap Data Set	X	X	

Will be determined in the context of the IR/VLD Wave 2 Call<sup>9</sup>

Transversal Deliverables 2018-2020	2018	2019	2020
Validation Data Management Platform and Services	X	X	
Validation Data traceability and coverage reports	X	X	
Validation & Demonstration Platform Development methodologies		X	
Technical Specifications for communalized and interoperable Validation tools		X	

**Table 3: Concept, Architecture and Performance Steering activities deliverables in 2018-2020**

It is expected that Transversal Programme Steering, as well as the ATM Master Plan Maintenance activities, will be carried out in the period 2019-2021 in relation with IR Wave 2 (see paragraph 2.4.1.2). The process that will be followed in 2018 to determine the content of these activities in the context of Wave 2 is described in section III chapter 2.1.

### 2.2.3 Other activities carried out to assist stakeholders in matters related to the technological pillar of the SES

This paragraph puts on emphasis on three subjects which are of particular importance for the SESAR 2020 programme and on which the SJU will continue to assist its stakeholders by providing technical contribution to technological pillar of the Single European Sky initiative. These are the European Architecture of Airspace, Communication-Navigation-Surveillance (CNS) and Cyber-Security.

Indeed, in 2018, the SJU will develop a proposal for the future architecture of the European airspace<sup>10</sup>, inspired by the concept of the concept of “Trans-European Motorways of the sky” of the European Parliament, embracing a new era of innovation and digital technologies in consistency with the Single European Sky initiative, the European Aviation Strategy and the European ATM Master Plan. This airspace architecture, will aim to more efficiently support traffic flows and promote an optimised provision of air navigation services and the enabling ATM/CNS infrastructure. It will fully respond to the needs of the airspace users and support the concept of European Upper Information Region (EUIR). This activity should take into account SESAR-related operational concepts and technologies in view of defining a high-level deployment scenario. It should also support the development of a SES vision towards the 2035 horizon and associated high-level goals in particular with regards to the contribution to performance in terms of safety, capacity, environmental impact and flight efficiency. Furthermore this activity will provide the rationale and underlying assumptions to further update the European ATM Master Plan. The outcome of this activity shall set the vision on how the European airspace architecture should look like in the medium to long term (2035), describing the intended airspace organisation, design and operations and the steps to be taken to achieve that architecture. Building on the expertise of the SJU and the Network Manager in this area, the SJU will prepare, launch and manage the project, involving where appropriate the contribution from the Network Manager.

Furthermore, in the next decades, aviation infrastructure is going to play a key role in unlocking the full potential of automation and digitalisation. In this context, the SJU is leading a number of actions

<sup>10</sup> See delegation agreement EC/SESAR JU ref. MOVE/E3/DA/2017-477/SI2.766828 signed on 10/11/2017. The Union financial support for this initiative was approved by Commission Decision C (2017)4327 on the financing in 2017 of five new pilot projects in the field of Mobility and Transport

to provide aviation decision makers with an executive understanding of the transformation that is going to occur together with the critical path leading to the delivery of the vision. For instance, satellites are playing and will play an increasing role across the Communications, Navigation and Surveillance, delivering improved navigation performance, new surveillance capabilities and the data exchanges required for trajectory management. This technology is disrupting the current business models (that are currently mostly monolithic and ground centric), leading to rationalisation and cost efficiency. In this particular domain, the SJU is leveraging its strategic partnership and MoCs (ESA, EASA, EDA etc. – see Strategic Area of Operation 5 presented in paragraph 2.6) in combination with the SESAR 2020 projects delivering Solutions to prepare the way for the future aviation infrastructure.

In addition, the future European ATM System must be secure and resilient in order to support EU goals of modernisation of the ATM sector in line with the growth projections in European air traffic. Building on achievements in previous years, in the period 2018-2020 the focus will continue to be on creating an effective cyber-security approach in a SWIM-enabled environment with critical infrastructure requiring the adoption of cyber-security management, enabled to secure information and protect ATM against cyber-threats. Here also, the SJU will continue to develop the vision of future cyber-security in Aviation, leveraging both MoCs with relevant stakeholders (EASA, EDA, Shift<sup>2</sup>Rail Joint Undertaking etc.) and projects within the SESAR 2020 programme.

Moreover, the SJU will provide support to the Commission for the formal consultation related to the Common project 2 proposal (CP2, see SJU Single Programming Document 2017-2019 for further detail).

Additionally, in 2018 the SJU plans to conduct a study to define the optimum CNS infrastructure for Europe: further to the CP2 proposal on CNS rationalisation, the study will perform a critical analysis of the European CNS infrastructure (geographical distribution of assets and coverage, value chain, business models, air/ground equipage). Taking into account the CP2 assumptions, using simulation and modelling, the study will investigate optimisation options and formulate concrete recommendations on the optimum CNS infrastructure for Europe that satisfies the performance objectives set in the European ATM Master Plan.

#### **2.2.4 Support contracts or agreements / working arrangements**

In addition, in order to provide strategic advice to the SJU and to help in steering the SESAR 2020 programme, the SJU has set up five main agreements with additional stakeholder groups and an external support body:

- The Airspace Users support contract (with civil AUs),
- The Professional Staff Organisations working arrangement,
- The Authorities working arrangement (with National Aviation Authorities),
- The Airports support contract,
- The SESAR Development Support Services contract, covering industrial support, programme management support and the provision of a collaborative programme management platform.

The SJU is also developing relationships with newly and emerging stakeholders in the ATM in relation with the challenge of the digitalisation of Aviation.

## 2.2.5 Strategic Steering activities funding and Calls management

ATM Master Plan maintenance and Content Integration and Transversal Programme Steering activities are funded through Exploratory Research and Industrial Research & Validation Calls for proposals – see chapters 2.3 and 2.4 – as follows:

Ref.	Project short description	Call for proposal	Max. total co-financing value (in EUR)
<b>PJ.19</b>	Content Integration	IR/VLD 'Wave 1' Call (with reference H2020-SESAR-2015-2)	EUR 7.395.142
<b>PJ.20</b>	Master Plan maintenance		EUR 3.327.676
<b>PJ.22</b>	Validation and Demonstration Engineering		EUR 2.051.360
<b>PACAS</b>	<b>PACAS</b> (Participatory Architectural Change Management in ATM Systems) will model and analyse changes at different layers of the ATM system to support change management, while capturing how architectural and design choices influence the overall system.	ER 1 Call (with reference H2020-SESAR-2015-1)	EUR 998.355
<b>INTUIT</b>	<b>INTUIT</b> (Interactive toolset for understanding trade-offs in ATM performance) will explore the potential of visual analytics, machine learning and systems modelling techniques to improve our understanding of the trade-offs between ATM key performance areas.		EUR 998.125
<b>AURORA</b>	<b>AURORA</b> (Advanced user-centric efficiency metrics for air traffic performance analytics) will propose advanced metrics to assess the operational efficiency of the ATM system. These new metrics will be developed with the aim of encapsulating the airspace users' operational objectives, considering fuel consumption, schedule adherence and Cost efficiency of the flights		EUR 829.313
<b>APACHE</b>	<b>APACHE</b> (Assessment of performance in current ATM operations and of new Concepts of operations for its holistic enhancement) proposes a new framework to assess European ATM performance based on simulation, optimization and performance assessment tools that will be able to capture complex interdependencies between KPAs at different modelling scales.		EUR 783.838

**Table 4: Funding of the Strategic Steering activities**

As introduced in section II chapter 3.2, in addition to direct funding (Title III), the SJU also dedicates a proportion of its running costs (Title I and Title II) to carry out the programme steering activities. The overall funding of Strategic Area of Operation #1 is indicated in Annex I. Support contracts / agreements / working arrangements with additional stakeholder groups are funded through dedicated budget subject to procurement actions.

## 2.3 Strategic Area of Operation 2: Deliver Exploratory Research (ER)

As outlined in the SESAR 2020 Programme research topics presented in the introduction to chapter 2 (figure 6), Exploratory Research is structured around 4 areas:

- **Two transversal activities:**
  - The **'Future European ATM skilled work-force'** will develop the mechanism to provide the required European ATM education & training as well as networking capability which can uniquely be created through SESAR and in the ATM Community as well as establishing effective knowledge transfer mechanisms;
  - The **'Knowledge Transfer Network'** will assess and coordinate project results to contribute to identification of innovative ideas, concepts and models that can support the identification of ATM system concept trade-offs new technology validation at system level and requirements definition and consolidation. The ATM research community will be able to share research results.
  
- **Two research areas:**
  - **ATM Excellent Science & Outreach** aims at bridging ATM research with the wider research community and providing the necessary scientific support to ATM change either directly or through connection to other funded research areas in other disciplines or sectors, under the following topics:
    - Automation, Robotics and Autonomy,
    - Complexity, Data Science and Information Management,
    - Environment and Meteorology for ATM,
    - Performance, Economics, Legal and Regulation,
    - ATM role in intermodal transport,
    - CNS for ATM;
  - **ATM application-oriented research** will help mature new concepts for ATM beyond those identified in the European ATM Master Plan as well as help to mature emerging technologies and methods to the level of maturity required to feed the applied research conducted in the SJU. This part of Exploratory Research will be structured around the four Key Features of the programme and the transversal needs to ensure there is a flow of ideas and results in a structured manner across the whole programme.

Exploratory Research is fully funded by the European Union under the H2020 framework and has a total funding of EUR 85 million which includes a dedicated proportion of direct funding (Title III through open Calls for proposals) and a proportion of SJU running costs (Title I and Title II) to carry out the Exploratory Research activities. The overall funding of Strategic Area of Operation #2 (Exploratory Research) for the period from 2018 to 2020 is indicated in Annex I.

A sequence of 4 Calls for proposals cover the full spectrum of Exploratory Research activities over the period from 2015 to 2021, as depicted in the following figure:



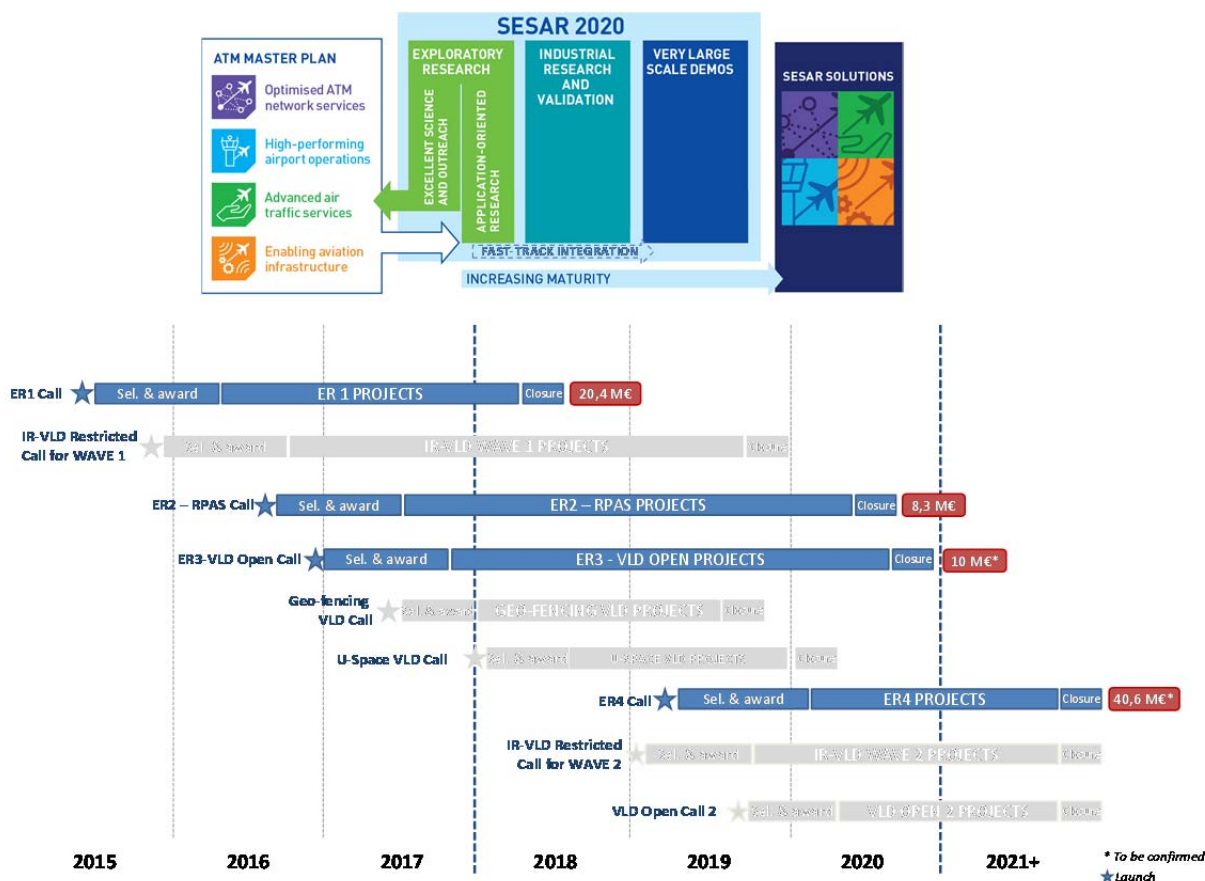


Figure 9: Sequence of ER Calls and related funding 2015-2021

As depicted in this figure, during the period 2018-2020, the SJU will, for Exploratory Research activities:

- Supervise, then close in 2018 the projects launched under the ER1 Call with reference H2020-SESAR-2015-1, as well as the related grant agreements,
- Supervise, then close in 2019 the projects launched under the ER2-RPAS Call (with reference H2020-SESAR-2016-1) and ER3 Call (within the Call with reference H2020-SESAR-2016-2), as well as the related grant agreements<sup>11</sup>,
- Plan (in 2018) and execute (in 2019-2020) the transfer of results of the ER1 projects into Wave 2 and ER4 projects (see section III paragraph 2.1.2),
- Plan and organise the procedure for an ER4 Call, sign the related grant agreements, then launch and supervise the awarded projects.

<sup>11</sup> Subject to the successful conclusion of the grant agreement signature process early 2018



### 2.3.1 Calls already closed and projects already launched at the end of 2017

The following paragraphs provide an overview of the Call results related to Exploratory Research at the end of 2017.

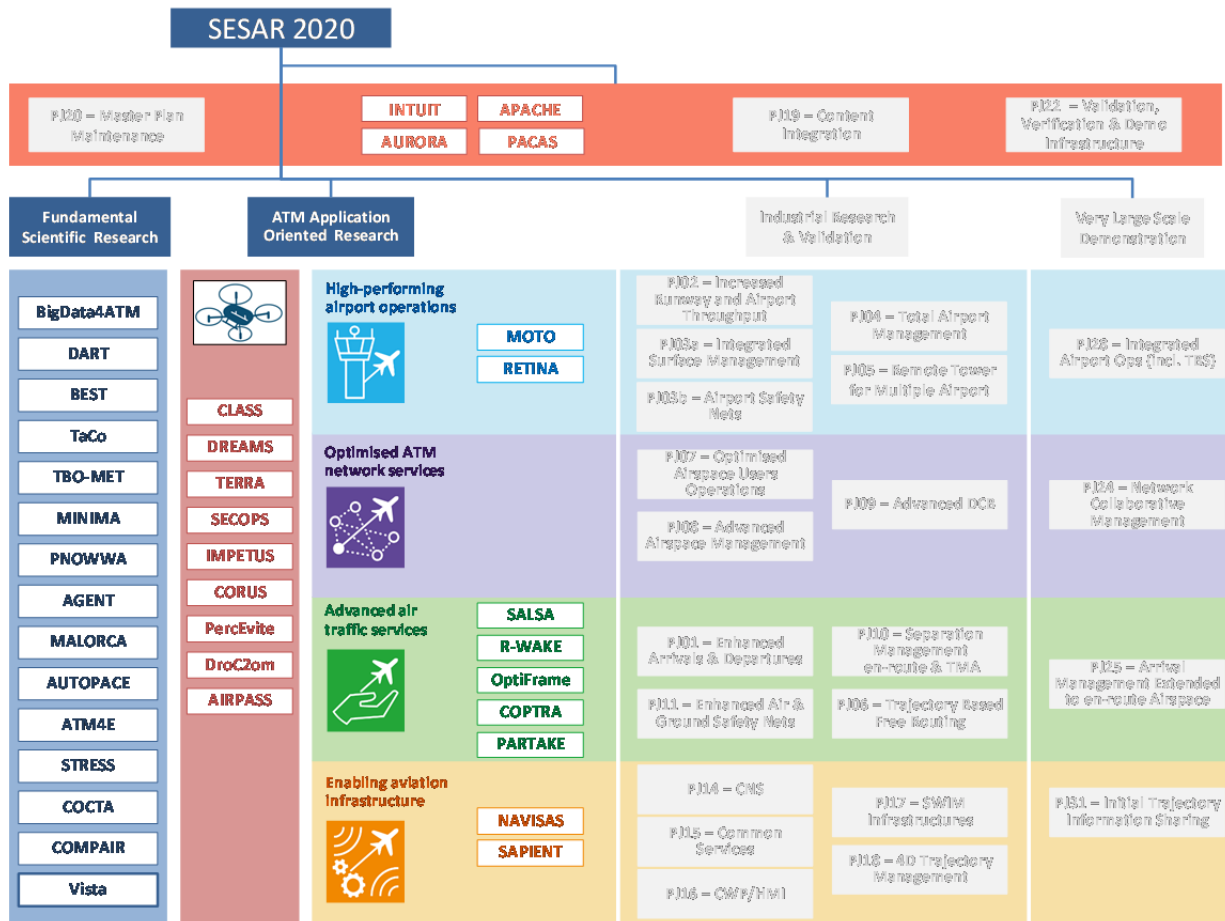


Figure 10: Exploratory Research work breakdown structure at the end of 2017

For all the related grants, the SJU will comply with all provisions of H2020 work programme 2016-2017, including Annex L of 20. General Annexes related to open access to research data (see European Commission Decision C(2016)4614 of 25 July 2016).

#### 2.3.1.1 ER1 Call with reference H2020-SESAR-2015-1

In 2015, the first Call of the Exploratory Research within the SESAR 2020 Programme, fully funded under Horizon 2020, was launched to enable continued work on conducting and consolidating innovative activities in order to achieve tangible results under the scope of ATM Excellence Science & Outreach and ATM application-oriented research (see ER research topics in figure 5).

Out of the total maximum co-financing level of EUR 20,6 million, the outcome of the Call was an award for EUR 20,4 million and the selection of 28 ER1 projects which have progressively been launched into execution. The selected projects bring together universities, SMEs, research centres, airlines, industries, ANSPs from across the European Union and EU Associated Countries. With these projects, the aim will be to create the research repository and ideas that contribute to the SESAR innovation pipeline whereby new ideas can be funnelled into the programme’s industrial and demonstration research strands.

These 28 projects are delivering the following objectives by mid-2018, period when they will be closed:

### ATM Excellent Science & Outreach<sup>12</sup>


Topic	Short Project Description	Max. total co-financing value (in EUR)
Project reference		
<b>Automation, Robotics and Autonomy</b>		
<b>AUTOPACE</b>	<b>AUTOPACE</b> (Automation pace) proposes research on a Psychological Model to quantitatively predict how automation would impact on human performance based on cognitive resources modelling, tasks characteristics (automation) and psychological factors modelling.	EUR 599.868
<b>TACO</b>	<b>TACO</b> (Take control) aims to define an automated system sufficiently powerful to both accomplish complex tasks involved in the management of surface movements in a major airport and self-assess its own ability to deal with non-nominal conditions. When needed, such system should be sensitive enough to transfer responsibilities for traffic management back to the controller, in a timely and graceful manner and in way that makes him/her comfortable with the inherited tasks.	EUR 599.993
<b>AGENT</b>	<b>AGENT</b> (Adaptive self-Governed aerial ecosystem by negotiated traffic) seeks to implement a new framework extending the functionalities of TCAS to act at pre-operational and at operational level as a robust collision avoidance system for different context scenarios in which human behaviour and automatism interdependencies will be considered with realistic aircraft performances.	EUR 598.750
<b>STRESS</b>	<b>STRESS</b> (Human performance neurometrics Toolbox for highly automated systems design) project will explore human performance in highly automated systems, in order to provide new knowledge and guidelines needed for the design and implementation of higher levels of automation, with the related procedures and humans' roles. For doing that, the project will collect technologies and methods already validated in non ATM sectors and apply them in realistic future ATM scenarios.	EUR 596.875
<b>MINIMA</b>	<b>MINIMA</b> (Mitigating negative impacts of monitoring high levels of automation) will research new human-automation interaction design concepts.	EUR 582.780


<sup>12</sup> The ER research topics 'ATM role in intermodal transport' and 'CNS for ATM' were not covered in the ER1 call


Topic  Project reference	Short Project Description	Max. total co-financing value (in EUR)
<b>Complexity, Data Science and Information Management</b>		
<b>BigData4ATM</b>	<b>BigData4ATM</b> (Passenger-centric big data sources for socio-economic and behavioural research in ATM) will investigate how ATM and aviation data can be analysed and combined with more traditional demographic, economic and air transport databases to extract relevant information about passengers' behaviour and use this information to inform ATM decision-making processes.	EUR 599.733
<b>DART</b>	<b>DART</b> (Data-driven aircraft trajectory prediction research) explores the applicability of data science and complexity science techniques to the ATM domain. It will investigate on the suitability of applying big data techniques for predicting multiple correlated aircraft trajectories based on data driven models and accounting for ATM network complexity effects.	EUR 598.524
<b>MALORCA</b>	<b>MALORCA</b> (Machine learning of speech recognition models for controller assistance) proposes a general, cheap and effective solution to automate re-learning, adaptation and customisation process to new environments, taking advantage of the large amount of speech data available in the ATM world.	EUR 538.104
<b>BEST</b>	<b>BEST</b> (Achieving the benefits of SWIM by making smart use of semantic technologies) will determine how semantic technologies can be used effectively to maximise the benefits of adopting system-wide information management.	EUR 593.129
<b>Environment &amp; Meteorology</b>		
<b>TBO-MET</b>	<b>TBO-MET</b> (Meteorological uncertainty management for trajectory-based operations) will address the problem of analysing and quantifying the effects of meteorological uncertainty in Trajectory-based operations (TBO).	EUR 488.750
<b>ATM4E</b>	<b>ATM4E</b> (Air traffic management for environment) will explore the scope for the potential reduction of air traffic environmental impacts in European airspace on climate, air quality and noise through optimization of air traffic operations.	EUR 599.625
<b>PNOWWA</b>	<b>PNOWWA</b> (Probabilistic nowcasting of winter weather for airports) will produce methods for the probabilistic short-term forecasting of winter weather and enable the assessment of the uncertainty in the ground part of 4D trajectories.	EUR 597.500

Topic	Short Project Description	Max. total co-financing value (in EUR)
Project reference		
<b>Performance, Economics, Legal &amp; Regulation</b>		
<b>COCTA</b>	<b>COCTA</b> (Coordinated capacity ordering and trajectory pricing for better-performing ATM) proposes coordinated economic measures aiming to pre-emptively reconcile air traffic demand and airspace capacity. The project primarily aims to reduce the cost arising from lack of coordination in the ATM system, stemming both from divorced planning horizons of ANSPs and aircraft operators (AOs), and from an inadequate pricing of navigation services.	EUR 534.158
<b>Vista</b>	<b>Vista</b> (Market forces trade-offs impacting European ATM performance) will examine the effects of conflicting market forces on European performance in ATM, through the evaluation of impact metrics on four key stakeholders and the environment.	EUR 599.188
<b>COMPAIR</b>	<b>COMPAIR</b> (Competition for air traffic management) will investigate how to introduce competitive incentives in the ATM sector so as to best contribute to the achievement of the European high-level policy objectives for aviation.	EUR 599.804

#### ATM application-oriented research

Key Feature	Short Project Description	Max. total co-financing value (in EUR)
Project reference		
 <b>High-performing airport operations</b>		
<b>MOTO</b>	<b>MOTO</b> (the embodied remote tower) will perform research on ATM human performance of using two senses: sight and hearing in the context of remote tower operations. The goal is to enhance human performance, by exploiting other channels than the already overloaded visual channel	EUR 999.000
<b>RETINA</b>	<b>RETINA</b> (Resilient Synthetic Vision for Advanced Control Tower Air Navigation Service Provision) project will investigate the potential and applicability of synthetic vision tools and virtual/augmented reality display techniques for the air traffic control service provision by the airport control tower.	EUR 949.160

Key Feature Project reference	Short Project Description	Max. total co-financing value (in EUR)
 <b>Advanced air traffic services</b>		
<b>Separation Management &amp; Separation Standards</b>		
<b>SALSA</b>	<b>SALSA</b> (Satellite-based ADS-B for lower separation minima application) is an exploratory research project relating to multi-source ADS-B system. A multi-source ADS-B system that combines the benefit of all possible type of relays (space, maritime, air or ground based) of ADS-B messages could provide a global surveillance system to overcome the prevailing continuous surveillance constraints in the non-radar airspace (NRA).	EUR 995.064
<b>R-WAKE</b>	<b>R-WAKE</b> (Navigation of airborne vehicle with integrated space and atomic signals) will propose a novel concept of APNT for small aircraft that will integrate novel technologies and will merge multiple navigation avionics into one with no major impact on avionics.	EUR 997.130
<b>Trajectory-based operations</b>		
<b>OptiFrame</b>	<b>OptiFrame</b> (An optimisation framework for trajectory-based operations) will research a number of fundamental questions related to trajectory-based operations (TBO), a key element of future ATM operating concepts.	EUR 727.501
<b>COPTRA</b>	<b>COPTRA</b> (Combining probable trajectories) aims to propose, in a TBO, an efficient method to build probabilistic traffic forecasts on the basis of flight trajectory predictions.	EUR 999.391
<b>PARTAKE</b>	<b>PARTAKE</b> (Cooperative departures for a competitive ATM network service.) will propose a causal model to enhance the potential synergies that could be achieved by exploiting to the maximum extend the gap provided by the strategic decision variables and the operational decision making at flight execution.	EUR 985.750

Key Feature Project reference	Short Project Description	Max. total co-financing value (in EUR)
 <b>Enabling aviation infrastructure</b>		
<b>NAVISAS</b>	<p><b>NAVISAS</b> (Navigation of airborne vehicle with integrated space and atomic signals) will propose a novel concept of APNT for small aircraft that will integrate novel technologies and will merge multiple navigation avionics into one with no major impact on avionics.</p>	EUR 584.979
<b>SAPIENT</b>	<p><b>SAPIENT</b> (Satcom and terrestrial architectures improving performance, security and safety in ATM) project addresses a new innovative application in the field of CNS/ATM system focusing exploitation of the synergies of communications and navigation technologies and the 4D trajectory management concept.</p> <p>Note: the SAPIENT project will be closing by the end of 2017.</p>	EUR 859.500

**ATM Operations, Architecture, Performance & Validation (see chapter 2.1)**

**Table 5: ER1 projects outline (under the Call with reference H2020-SESAR-2015-1)**

To complement ER1 Call, the SESAR JU launched 2 Calls in 2016: ER2-RPAS focusing on RPAS and ER3.

**2.3.1.2 ER2 – RPAS Call with reference H2020-SESAR-2016-1**

In 2016, the second Call related to Exploratory Research within the SESAR 2020 Programme, fully funded under Horizon 2020, was launched to address the domain of Remotely Piloted Aircraft Systems (RPAS) and unmanned vehicles (UAS).

- The **UAS/RPAS integration operational issues** project will deliver the SESAR Traffic Management (U-space) Concept Definition addressing the operational concept to enable the operation of drones of all capabilities in the very low-level (VLL) environment, including urban drone operations, the role of autonomy and operational mitigations to command and control failure/corruptions. The required interface with air traffic control (ATC) and the role of incursion protection against protected areas will be addressed. The SESAR U-space concept definition will address operational needs and provide a functional breakdown of the U-space;
- The **RPAS integration technical issues** projects will deliver emerging technology options to support drone operations and integration in the VLL and VFR domains. Emerging technologies and applications for U-space from advanced fields such as IT, telecoms, intelligent systems or robotics will be fast-tracked into providing solutions to specific problems that are core to the near-term development of the EU drone industry. It should

also help bridge SESAR U-space research with the wider scientific community and will provide the science necessary to support the safe integration of VLL drones, considering higher levels of automation. enable continued work on conducting and consolidating innovative activities in order to achieve tangible results under the scope of ATM Excellence Science & Outreach and ATM application-oriented research (see research topics in figure 5).

Out of the total maximum co-financing level of EUR 9 million, the outcome of the Call was an award for EUR 8,3 million and the selection of nine ER2-RPAS projects<sup>13</sup> which are progressively launched into execution until the beginning of 2018.

These nine projects are delivering the following objectives by mid-2020, with a project closure planned towards the end of 2020:

Project reference	Project Title	Short Project Description	Max. total co-financing value (in EUR)
AIRPASS	Advanced Integrated RPAS Avionics Safety Suite	<p>Drones appear in a large variety of types, configurations and sizes. They are operated in a large variety of operational environments (i.e. locations, classes of airspace). However, it is essential that they interoperate with other drones as well as with manned aircraft.</p> <p>This project addresses the on-board technologies for drones that are required in order to implement the Unmanned Traffic Management (UTM) concept for drone operations at Very Low Level (VLL) and within the Visual Flight Rules (VFR) environment. The project will cover Detect And Avoid (D&amp;A) systems for cooperative and non-cooperative traffic, auto-pilot systems as well as Communication, Navigation and Surveillance (CNS) systems. This project will identify the available CNS infrastructure and on-board technologies to formulate an implementation approach.</p> <p>Based on this an on-board system concept will be developed and evaluated.</p>	EUR 986.224
CLASS	Clear Air Situation for uaS	CLASS or Clear Air Situation for uaS will mature ground based technologies for a real-time Unmanned Aerial System Traffic Management System (UTMS) to monitor and separate Unmanned Aerial System (UAS) traffic	EUR 909.973

<sup>13</sup> Subject to the completion of the call evaluation process. One project proposed for award as a result of the ER2-RPAS call is still subject to evaluation and the final award decision is expected by the end of 2017

Project reference	Project Title	Short Project Description	Max. total co-financing value (in EUR)
CORUS	Concept of Operations for EuRoPeaN UTM Systems	Building on the state-of-the-art, CORUS (Concept of Operations for EuRoPeaN UTM Systems) will develop an operational concept enabling safe interaction between all airspace users in Very Low Level considering contingencies and societal issues.	EUR 800.000
DREAMS	DRone European AIM Study	The DREAMS project aims at contributing to the definition of the European UTM Aeronautical Information Management operational concept by exploring need for and feasibility of new processes, services and solutions for the drone aeronautical information management within the new UTM concept.	EUR 710.435
DroC2om	Drone Critical Communications	DroC2om addresses Drone Critical Communications. The key objective of the DroC2om project is to contribute to the definition of integrated cellular-satellite data link specifications for UASs.	EUR 1.270.543
IMPETUS	Information Management Portal to Enable the inTegration of Unmanned Systems	IMPETUS will research on the application of the 'micro-services' paradigm as a flexible and cost efficient solution for lifecycle support of the expected high variety of drones and missions	EUR 899.160
PercEvite	PercEvite - Sense and avoid technology for small drones	PercEvite addresses Sense and avoid technology for small drones for autonomously detecting and avoiding "ground-based" obstacles and flying objects. To avoid ground-based obstacles, we aim for a lightweight, energy-efficient sensor and processing package that maximizes payload capacity.	EUR 899.008
SECOPS	An Integrated Security Concept for Drone Operations	SECOPS deals with an Integrated Security Concept for Drone Operations. SECOPS' objective is to push drone technology forward by ensuring that security risks in the Unmanned Traffic Management (UTM) concept are mitigated to an acceptable level.	EUR 909.294
TERRA	Technological European Research for RPAS in ATM	TERRA addresses the research topic Ground-based technology, focusing on the performance requirements associated with the UTM concept, and identifying the technologies (existing and new) which could meet these requirements.	EUR 937.000

**Table 6: ER2-RPAS projects outline (under the Call with reference H2020-SESAR-2016-1)**



### 2.3.1.3 ER3 within the Call with reference H2020-SESAR-2016-2

A third Call related to Exploratory Research (within the Call with reference H2020-SESAR-2016-2 ER/VLD Open) was launched at the end of 2016. Eight grant agreements<sup>14</sup> are expected to be signed as a result of this Call. This will lead to the delivery of results in the domains of Transversal Exploratory Research and of ATM application-oriented research topics, which builds on and complements the research topics already included in the ER1 Call. The grants awarded in that context will deliver their results in the period 2018-2020. As indicated in the 2016 Annual Work Plan and Single Programming Document 2017-2019, and subject to the completion of the call procedure and successful awards of grants by the end of 2017, these Exploratory Research projects will cover the following range of activities:

- **Transversal Exploratory Research** will establish the **Knowledge Transfer Network** across ATM exploratory research, providing a coordinated exchange of research knowledge focussing on the assessment, transfer and communication, and sharing of research results among the ATM community. The Network will support and encourage collaborative research on future and emerging innovative ideas, expertise and knowledge for the benefit of the future evolution of the European ATM system and its people through funding of PhD projects, enabling researcher mobility and the transfer of research skills and knowledge (open access to research data) across the research community. The Network will organise interdisciplinary or themed network activities based around key ATM research subjects and SJU exploratory research projects with the aim to stimulate learning and the exchange of knowledge between academia, the research community and industrial partners. Introducing knowledge from other disciplines will also encourage the exploration and exploitation of investments already made in other sectors, leading to innovative and unconventional ideas in ATM. The Network activities will cover all the topics, Key Features and transversal needs covered by ER projects in both research areas (ATM Excellent Science & Outreach and ATM Application-Oriented Research);  
As it is intended that organisations within exploratory research projects will be encouraged to benefit from the support of postgraduate students including PhDs, provisions will be made to allow organisations selected as a result of a Call for proposals and selection procedure to make funding available for third-parties;
- **ATM application-oriented research** in ER3 will deliver new concepts for ATM beyond those identified in the ATM Master Plan as well as emerging technologies and methods to the level of maturity required to feed the applied research conducted in the Industrial Research and Validation phase of SESAR; thus connecting the ATM Exploratory Research to the ATM Applied Research in the context of the European ATM Master Plan. The projects to be awarded under this Call will deliver results based on the following five topics:
  - Advanced Air Traffic Services – Projects will propose new separation minima when non-surveillance information on the aircraft position is available, for example for aircraft flying on PBN routes, flights having downlinked their FMS-predicted trajectory, or flights having agreed to comply with specific ATM constraints.
  - Optimised ATM Network Services – Projects will propose solutions for the application of Trajectory Based Operations in support of DCB functions, independent to any specific

<sup>14</sup> A total of sixteen grant agreements are expected to be signed under the call with reference H2020-SESAR-2016-2 comprising both ER and Open VLD

system architecture allowing the extension of such functions to a global context leading to a consistent and coherent trajectory management approach within and between regions.

- Enabling Aviation Infrastructure – Projects will investigate how lightweight and/or low-cost devices suitable for airspace users such as General Aviation, could be allowed to operate safely and effectively alongside full-specification devices without compromising safety or adversely impacting the aviation spectrum environment. Projects will address how technology for voice and data link communications, PBN, surveillance, and collision-avoidance, could be regulated and approved by aviation authorities without having to undergo the rigorous and costly certification processes associated with existing full-specification devices.
- Enabling Aviation Infrastructure – Projects will assess the use, or adaptation, of new technologies being developed outside ATM to support ATM Communication, navigation and surveillance (CNS) needs including analysis of the safety, performance and security implications for the ATM system. More flexible system architectures for ground and airborne systems will be considered in this context (e.g. building on integrated modular avionics and an open interface approach to ground system development) to help unlock us from legacy technologies.
- ATM Operations, Architecture, Performance and Validation - Projects will analyse and propose evolutionary approaches aimed at guaranteeing the robust transition of the ATM system architecture towards the future. This includes the needs and challenges in developing a harmonised technical infrastructure for ANS, including its operational and economic impacts.

After the grant agreement preparation phase is completed, the ER3 projects will progressively be launched into execution at the beginning of 2018.

### **2.3.2 Other future Call activities on Exploratory Research to be carried out in the period 2018-2020: ER4 Call with reference H2020-SESAR-2019-2**

A further Exploratory Research Call is planned to be launched in 2019 ('ER4 Call'). After completion of the call procedure and successful awards of grants, the Exploratory Research projects in that context should be launched into execution in early 2020 and would begin to deliver initial results in the 2020 timeframe, with an expected closure by end 2021. This Call will build on and complement the research topics already included in the earlier ER Calls launched in 2015 and 2016 (see above) in both ATM Excellent Science & Outreach and ATM application-oriented research. ER4 is intended to be the last Call for Exploratory Research, when it is anticipated that all SESAR 2020 ER budget will be consumed. If not sufficiently consumed, an additional Exploratory Research Call may be established before the end of 2020.

In preparation for this, during the year 2018, the SJU will carry out activities required to define the content of the ER4 Call. These activities are described in section III chapter 2. Furthermore, in 2019 and 2020, taking account of the outcome of the ER4 Call, the SJU will analyse the gap between the expected Exploratory Research results and the objectives set by the Master Plan for the SESAR 2020 Programme in relation to Exploratory Research, and plan for necessary actions.

## 2.4 Strategic Area of Operation 3: Deliver Industrial Research & Validation (IR)

There are new challenges deriving from an evolving concept of operations, new business models, integration of new air vehicle types and the need for increased connectivity and digital information exchange for collaboration, which brings an increased focus on cyber-security.

During the reporting period, SESAR 2020 Industrial Research and Validation (IR) activities will facilitate the migration of ideas from Exploratory Research and have them further extended in the applied research and finally to pre-industrial development, validation, large scale demonstration and then final preparation for deployment. Therefore, the main objective of this Strategic Area of Operation is to deliver SESAR Solutions derived from the ATM Master Plan and identified in the SJU’s multi-annual work programme.

This will be done through projects run under two Calls for proposals restricted to the 19 SJU Members and EUROCONTROL, for which the total EU funding available under H2020 is EUR 337,7 million in direct costs (of which EUR 311,9 million for IR and EUR 25,8 million dedicated to Strategic Steering activities – see paragraph 2.1 above), as depicted in the figure below. The exact amount of each Call is to be confirmed, especially to take into account the results of the grant amendment procedure on grants established under the Call with reference H2020-SESAR-2015-2 in 2017 and 2018. The procedure to define the Wave 2 Call with reference H2020-IBA-SESAR-2019-1 is described in section III paragraph 2.1.2). In addition, a proportion of SJU running costs (Title I and Title II) is used to carry out the Industrial Research & Validation activities. The overall funding of Strategic Area of Operation #3 (Industrial Research & Validation) for the period from 2018 to 2020 is indicated in Annex I.

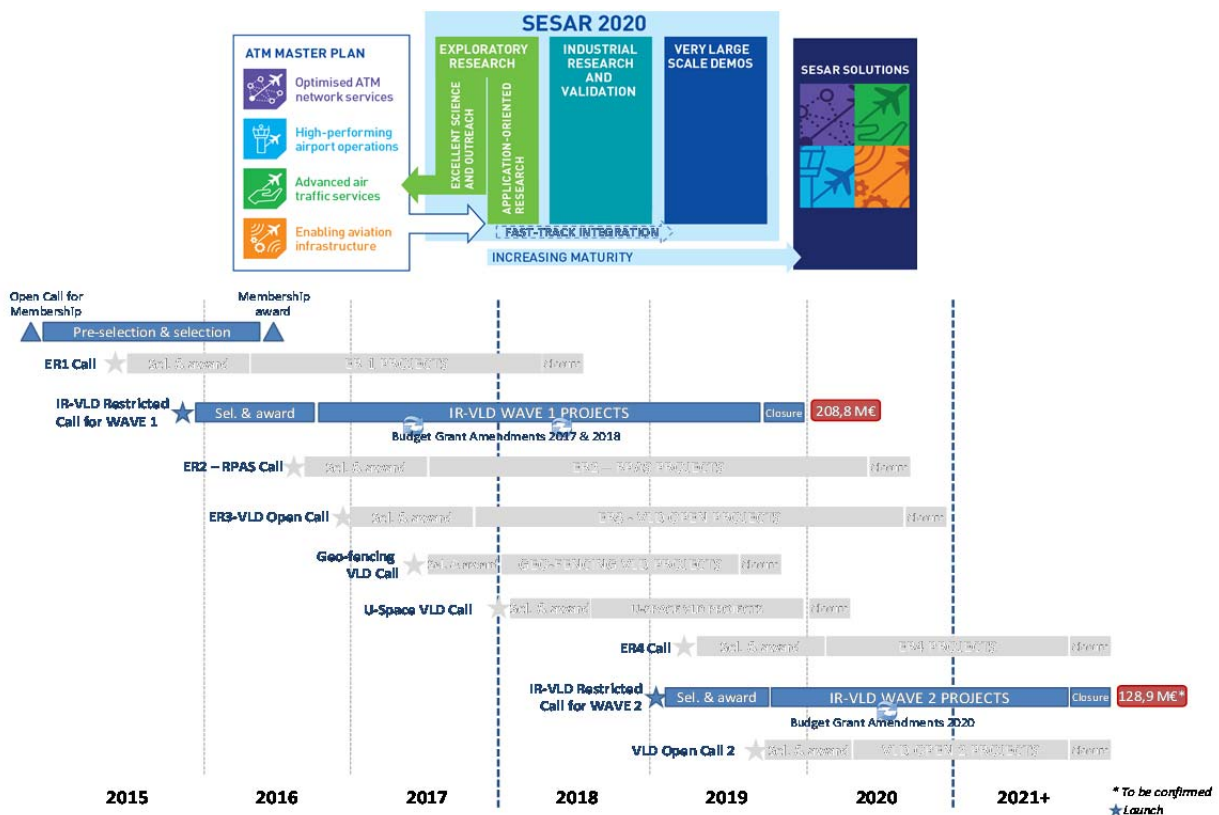


Figure 11: Sequence of IR Calls and related funding 2015-2021

Therefore, during the period from 2018 to 2020, the SJU will, in the context of Industrial Research & Validation activities:

- Supervise, then close the Wave 1 projects (including Strategic Steering activities which are introduced in chapter 2.1 above), as well as the related grant agreements,
- Plan and organise the call procedure for Wave 2 projects,
- Plan (in 2018) and execute (in 2019-2020) the transfer of results of the ER1 Call and Wave 1 results into Wave 2 projects.

**2.4.1 IR Wave 1 (2016-2019) – Call with reference H2020-SESAR-2015-2**

In the period from 2018 to 2019, and in continuation with the activities of the period in 2016 and 2017, the SESAR Solutions will be delivered through 17 Industrial Research & Validation (IR) projects covering the whole scope of IR as described above in the IR research topics, with the exception of topic ‘Air Vehicle Systems’ as part of the Enabling aviation infrastructure Key Feature, for which no project has been awarded as a result of the Wave 1 Call; this topic will be included in Wave 2. The closure of these projects will be performed by the end of 2019. As outlined in the SESAR 2020 Programme research topics presented in the introduction to chapter 2, Industrial Research & Validation (IR) is structured around the 4 Key Features of the ATM Master Plan:

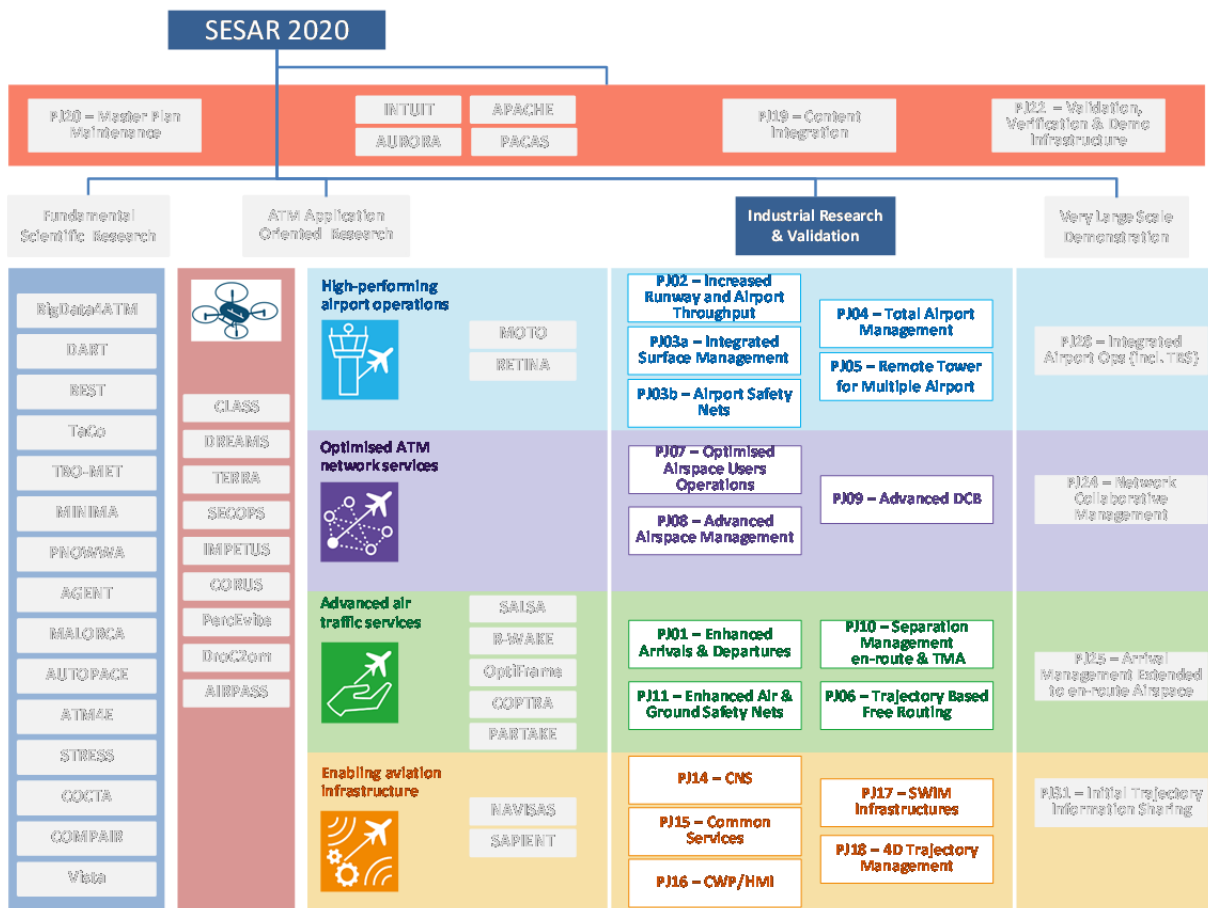


Figure 12: Industrial Research & Validation work breakdown structure as at the end of 2017

For 2020, the execution of the Industrial Research & Validation is dependent on the results of the Call IR/VLD Wave 2 (with reference H2020-IBA-SESAR-2019-1) which will take place in 2019 (see section III chapter 2.3 for the related preparatory work conducted in 2018).

Within IR Wave 1, the SESAR 2020 programme will comply with all provisions of H2020 Work Programme 2016-2017. However, it should be noted that the SESAR 2020 programme will deliver results through the SESAR Solutions and not project by project. Therefore, it is not necessary for all IR projects to provide open access for all data, and therefore IR projects will opt out of the provisions of Annex L of 20. General Annexes related to open access to research data (see European Commission Decision C(2016)4614 of 25 July 2016). This opt-out also aims to protect results that are expected to be commercially or industrially exploited.

The following paragraphs indicate the SESAR Solutions that will be developed (and, in some cases, delivered) by the above listed projects through the SESAR Release process. Each entry represents the targeted achievement of an E-OCVM maturity level (V1, V2, or V3); an “S” represents the target availability date of the SESAR Solution. This information has been established according to the Extended Release Strategy that was developed as part of the Multi-Annual Work Programme in early 2015.

#### 2.4.1.1 IR Projects Delivering Solutions within ‘Optimised ATM Network Services’ Key Feature



The “Optimised ATM Network Services” Industrial Research and Validation projects aim at delivering the following results (SESAR Solutions) in the 2018 to 2019 timeframe.

SESAR Solution ref.	SESAR Solution Title	Delivery timing <sup>15</sup>		ATM Master Plan KPAs and Performance Focus Areas contributed to <sup>16</sup>
		2018	2019	
PJ.07-01	AU Processes for Trajectory Definition		V2 ongoing	<ul style="list-style-type: none"> <li>Operational efficiency</li> <li>Predictability</li> <li>Flexibility</li> <li>Access &amp; Equity</li> </ul>
PJ.07-02	AU Fleet Prioritization and Preferences (UDPP)		V2 ongoing	<ul style="list-style-type: none"> <li>Predictability</li> <li>Flexibility</li> <li>Access &amp; Equity</li> </ul>

<sup>15</sup> This information has been aligned with the Extended Release Strategy established with the support of the Programme Committee in Q3 2017

<sup>16</sup> This information is still under development and validation within the SESAR 2020 programme, therefore it should not be taken as final at this stage

SESAR Solution ref.	SESAR Solution Title	Delivery timing <sup>15</sup>		ATM Master Plan KPAs and Performance Focus Areas contributed to <sup>16</sup>
		2018	2019	
PJ.07-03	Mission Trajectory Driven Processes	V2	V3 ongoing	<ul style="list-style-type: none"> <li>• Predictability</li> <li>• Security</li> <li>• Access &amp; Equity</li> </ul>
PJ.08-01	Management of Dynamic Airspace configurations		V2	<ul style="list-style-type: none"> <li>• Cost efficiency</li> <li>• Safety</li> <li>• Operational efficiency</li> <li>• Capacity</li> <li>• Predictability</li> <li>• Human Performance</li> <li>• Cost efficiency</li> <li>• Flexibility</li> <li>• Civil/Military Cooperation and Coordination</li> <li>• Access &amp; Equity</li> </ul>
PJ.08-02	Dynamic Airspace Configuration supporting moving areas		V1	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Operational efficiency</li> <li>• Capacity</li> <li>• Predictability</li> <li>• Human Performance</li> <li>• Flexibility</li> <li>• Civil/Military Cooperation and Coordination</li> <li>• Access &amp; Equity</li> </ul>
PJ.09-01	Network Prediction and Performance		V2 ongoing	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Operational efficiency</li> <li>• Capacity</li> <li>• Cost efficiency</li> <li>• Predictability</li> <li>• Flexibility</li> <li>• Access &amp; Equity</li> </ul>

SESAR Solution ref.	SESAR Solution Title			Delivery timing <sup>15</sup>		ATM Master Plan KPAs and Performance Focus Areas contributed to <sup>16</sup>
				2018	2019	
PJ.09-02	Integrated Local DCB Processes				V2 ongoing	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Operational efficiency</li> <li>• Capacity</li> <li>• Cost efficiency</li> <li>• Predictability</li> </ul>
PJ.09-03	Collaborative Functions	Network	Management		V2 ongoing	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Operational efficiency</li> <li>• Predictability</li> <li>• Cost efficiency</li> <li>• Capacity</li> <li>• Flexibility</li> <li>• Security</li> <li>• Access &amp; Equity</li> </ul>

**Table 7: Solutions delivery within the Key Feature 'Optimised ATM Network Services' in the period 2018-2019**



### 2.4.1.2 IR Projects Delivering Solutions within the ‘High-Performing Airport Operations’ Key Feature



#### High-performing airport operations

The “High-Performing Airport Operations” Industrial Research and Validation projects aim at delivering the following results in the 2018 to 2019 timeframe:

SESAR Solution ref.	SESAR Solution Title	Delivery timing <sup>17</sup>		ATM Master Plan KPA Focus Areas contributed to <sup>18</sup>
		2018	2019	
PJ.02-01	Wake turbulence separation optimization		V3-S	<ul style="list-style-type: none"> <li>Capacity</li> <li>Operational efficiency</li> <li>Resilience</li> <li>Safety</li> </ul>
PJ.02-02	Enhanced arrival procedures		V3-S	<ul style="list-style-type: none"> <li>Capacity</li> <li>Operational efficiency</li> <li>Cost efficiency</li> </ul>
PJ.02-03	Minimum-Pair separations based on RSP		V3-S	<ul style="list-style-type: none"> <li>Capacity</li> <li>Operational efficiency</li> </ul>
PJ.02-05	Independent Rotorcraft operations at the Airport		V3-S	<ul style="list-style-type: none"> <li>Capacity</li> <li>Operational efficiency</li> <li>Predictability</li> <li>Safety</li> </ul>
PJ.02-06	Improved access into secondary airports in low visibility conditions		V2	<ul style="list-style-type: none"> <li>Capacity</li> <li>Predictability</li> <li>Safety</li> </ul>
PJ.02-08	Traffic optimisation on single and multiple runway airports	V2	V3-S	<ul style="list-style-type: none"> <li>Capacity</li> <li>Operational efficiency</li> <li>Predictability</li> <li>Safety</li> <li>Resilience</li> <li>Human Performance</li> </ul>

<sup>17</sup> This information has been aligned with the Extended Release Strategy established with the support of the Programme Committee in Q3 2017

<sup>18</sup> This information is still under development and validation within the SESAR 2020 programme, therefore it should not be taken as final at this stage.



SESAR Solution ref.	SESAR Solution Title	Delivery timing <sup>17</sup>		ATM Master Plan KPA Focus Areas contributed to <sup>18</sup>
		2018	2019	
PJ.02-11	Enhanced Terminal Area for efficient curved operation		V1	<ul style="list-style-type: none"> <li>• Capacity</li> <li>• Operational efficiency</li> <li>• Predictability</li> <li>• Safety</li> <li>• Cost efficiency</li> <li>• Flexibility</li> </ul>
PJ.03a-01	Enhanced Guidance Assistance to Aircraft and Vehicles on the Airport Surface Combined with Routing		V2	<ul style="list-style-type: none"> <li>• Capacity</li> <li>• Predictability</li> <li>• Safety</li> <li>• Human Performance</li> </ul>
PJ.03a-03	Enhanced navigation and accuracy in low visibility conditions (LVC) on the airport surface		V2	<ul style="list-style-type: none"> <li>• Capacity</li> <li>• Operational efficiency</li> <li>• Predictability</li> <li>• Safety</li> <li>• Resilience</li> </ul>
PJ.03a-04	Enhanced Visual Operations		V3	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Human Performance</li> <li>• Resilience</li> <li>• Operational efficiency</li> </ul>
PJ.03a-09	Surface operations by RPAS	V1	V2	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Access &amp; Equity</li> <li>• Interoperability</li> </ul>
PJ.03b-01	Enhanced Airport Safety Nets for Controllers		V2	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Human Performance</li> <li>• Interoperability</li> </ul>
PJ.03b-03	Conformance monitoring safety net for Pilots		V2	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Human Performance</li> <li>• Interoperability</li> </ul>
PJ.03b-05	Traffic alerts for pilots for airport operations		V3-S	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Human Performance</li> <li>• Interoperability</li> </ul>
PJ.03b-06	Safety support tools for runway		V2	<ul style="list-style-type: none"> <li>• Safety</li> </ul>

SESAR Solution ref.	SESAR Solution Title	Delivery timing <sup>17</sup>		ATM Master Plan KPA Focus Areas contributed to <sup>18</sup>
		2018	2019	
	excursions			<ul style="list-style-type: none"> <li>• Human Performance</li> <li>• Interoperability</li> <li>• Cost efficiency</li> <li>• Capacity</li> </ul>
PJ.04-01	Enhanced Collaborative Airport Performance Planning and Monitoring	V2	V3 ongoing	<ul style="list-style-type: none"> <li>• Predictability</li> <li>• Punctuality</li> <li>• Operational efficiency</li> <li>• Resilience</li> </ul>
PJ.04-02	Enhanced Collaborative Airport Performance Management		V2	<ul style="list-style-type: none"> <li>• Capacity</li> <li>• Predictability</li> <li>• Punctuality</li> <li>• Operational efficiency</li> </ul>
PJ.05-02	Remotely Provided Air Traffic Service for Multiple Aerodromes	V2	V3-S	<ul style="list-style-type: none"> <li>• Cost efficiency</li> <li>• Access &amp; Equity</li> <li>• Human Performance</li> </ul>
PJ.05-03	Remotely Provided Air Traffic Services from a Remote Tower Centre with a flexible allocation of aerodromes to Remote Tower Modules		V2	<ul style="list-style-type: none"> <li>• Cost efficiency</li> <li>• Access &amp; Equity</li> <li>• Human Performance</li> </ul>
PJ.05-05	Advanced Automated MET System for Remote Airport		V2	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Predictability</li> </ul>

**Table 8: Solutions delivery within the Key Feature ‘High-Performing Airport Operations’ in the period 2018-2019**

### 2.4.1.3 IR Projects Delivering Solutions within the ‘Advanced Air Traffic Services’ Key Feature



#### Advanced air traffic services

The “Advanced Air Traffic Services” Industrial Research and Validation projects aim at delivering the following results in the 2018 to 2019 timeframe:

SESAR Solution ref.	SESAR Solution Title	Delivery timing <sup>19</sup>		ATM Master Plan KPAs and Performance Focus Areas contributed to <sup>20</sup>
		2018	2019	
PJ.01-01	Extended Arrival Management with overlapping AMAN operations and interaction with DCB and CTA	V2	V3 ongoing	<ul style="list-style-type: none"> <li>• Capacity (TMA)</li> <li>• Predictability</li> <li>• Safety</li> <li>• Cost efficiency</li> <li>• Operational efficiency</li> </ul>
PJ.01-02	Use of Arrival and Departure Management Information for Traffic Optimisation within the TMA		V2	<ul style="list-style-type: none"> <li>• Capacity</li> <li>• Predictability</li> <li>• Safety</li> <li>• Cost efficiency</li> <li>• Operational efficiency</li> <li>• Flexibility</li> </ul>
PJ.01-03A	Improved Parallel Operations	V2	V3 ongoing	<ul style="list-style-type: none"> <li>• Capacity</li> <li>• Predictability</li> <li>• Safety</li> <li>• Cost efficiency</li> <li>• Operational efficiency</li> <li>• Flexibility</li> </ul>

<sup>19</sup> This information has been aligned with the Extended Release Strategy established with the support of the Programme Committee in Q3 2017

<sup>20</sup> This information is still under development and validation within the SESAR 2020 programme, therefore it should not be taken as final at this stage.

SESAR Solution ref.	SESAR Solution Title	Delivery timing <sup>19</sup>		ATM Master Plan KPAs and Performance Focus Areas contributed to <sup>20</sup>
		2018	2019	
PJ.01-03B	Dynamic E-TMA for advanced continuous climb and descent operations		V2 ongoing	<ul style="list-style-type: none"> <li>• Capacity</li> <li>• Predictability</li> <li>• Safety</li> <li>• Cost efficiency</li> <li>• Operational efficiency</li> <li>• Flexibility</li> </ul>
PJ.01-03C	Dynamic Management of Sectors in Terminal Airspace			<ul style="list-style-type: none"> <li>• Capacity</li> <li>• Predictability</li> <li>• Safety</li> <li>• Cost efficiency</li> <li>• Operational efficiency</li> <li>• Flexibility</li> </ul>
PJ.01-05	Airborne Spacing Flight Deck Interval Management		V2	<ul style="list-style-type: none"> <li>• Capacity</li> <li>• Predictability</li> <li>• Safety</li> <li>• Cost efficiency</li> <li>• Operational efficiency</li> <li>• Interoperability</li> </ul>
PJ.01-06	Enhanced Rotorcraft and GA operations in the TMA		V3-S	<ul style="list-style-type: none"> <li>• Capacity</li> <li>• Predictability</li> <li>• Safety</li> <li>• Operational efficiency</li> </ul>
PJ.01-07	Approach Improvement through Assisted Visual Separation		V2	<ul style="list-style-type: none"> <li>• Capacity</li> <li>• Predictability</li> <li>• Safety</li> <li>• Cost efficiency</li> <li>• Operational efficiency</li> </ul>

SESAR Solution ref.	SESAR Solution Title	Delivery timing <sup>19</sup>		ATM Master Plan KPAs and Performance Focus Areas contributed to <sup>20</sup>
		2018	2019	
PJ.06-01	Optimized traffic management to enable Free Routing in high and very high complexity environments.		V3-S	<ul style="list-style-type: none"> <li>• Predictability</li> <li>• Cost efficiency</li> <li>• Operational efficiency</li> <li>• Interoperability</li> </ul>
PJ.06-02	Management of Performance Based Free Routing in lower Airspace		V2	<ul style="list-style-type: none"> <li>• Capacity</li> <li>• Predictability</li> <li>• Cost efficiency</li> <li>• Human Performance</li> <li>• Operational efficiency</li> <li>• Access &amp; Equity</li> <li>• Interoperability</li> </ul>
PJ.10-01a	High Productivity Controller Team Organisation		V2 (TMA)	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Operational efficiency</li> <li>• Cost efficiency</li> </ul>
			V3-S (En-route)	<ul style="list-style-type: none"> <li>• Capacity</li> <li>• Predictability</li> <li>• Flexibility</li> </ul>
PJ.10-01b	Flight Centred ATC	V1	V2	<ul style="list-style-type: none"> <li>• Capacity</li> <li>• Flexibility</li> <li>• Cost efficiency</li> <li>• Human Performance</li> <li>• Operational efficiency</li> <li>• Predictability</li> </ul>
PJ.10-01c	Collaborative Control		V2	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Operational efficiency</li> <li>• Cost efficiency</li> <li>• Capacity</li> <li>• Predictability</li> <li>• Flexibility</li> </ul>

SESAR Solution ref.	SESAR Solution Title	Delivery timing <sup>19</sup>		ATM Master Plan KPAs and Performance Focus Areas contributed to <sup>20</sup>
		2018	2019	
PJ.10-02a	Improved Performance in the Provision of Separation	V2	V3-S	<ul style="list-style-type: none"> <li>• Capacity</li> <li>• Safety</li> <li>• Human Performance</li> <li>• Cost efficiency</li> </ul>
PJ.10-02b	Advanced Separation Management	V1	V2 ongoing	<ul style="list-style-type: none"> <li>• Capacity</li> <li>• Operational efficiency</li> <li>• Predictability</li> <li>• Safety</li> <li>• Human Performance</li> <li>• Cost efficiency</li> </ul>
PJ.10-05	IFR RPAS Integration	V1	V2	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Interoperability</li> </ul>
PJ.10-06	Generic' (non-geographical) Controller Validations	V1		<ul style="list-style-type: none"> <li>• Cost efficiency</li> </ul>
PJ.11-A1	Enhanced Airborne Collision Avoidance for Commercial Air Transport normal operations - ACAS Xa		V3-S	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Human Performance</li> </ul>
PJ.11-A2	Airborne Collision Avoidance for Remotely Piloted Aircraft Systems – ACAS Xu	V1	V2	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Human Performance</li> </ul>
PJ.11-A3	ACAS for Commercial Air Transport specific operations – ACAS Xo		V2	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Human Performance</li> </ul>
PJ.11-A4	Airborne Collision Avoidance for General Aviation and Rotorcraft – ACAS Xp	V1	V2	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Human Performance</li> </ul>
PJ.11-G1	Enhanced Ground-based Safety Nets adapted to future operations		V2	<ul style="list-style-type: none"> <li>• Safety</li> <li>• Human Performance</li> </ul>

**Table 9: Solutions delivery within the Key Feature ‘Advanced Air Traffic Services’ in the period 2018-2019**

#### 2.4.1.4 IR Projects Delivering Solutions in the ‘Enabling Aviation Infrastructure’ Key Feature



The “Enabling Aviation Infrastructure” Industrial Research and Validation projects aim at delivering the following results in the 2018 to 2019 timeframe. Enabling Aviation Infrastructure projects are not mapped with Performance Focus Areas as their role in the work programme is to support the achievement of performance targets through operational projects. Similarly, the maturity of the Enabling Aviation Infrastructure Solutions is indicated according to the TRL (Technology Readiness Level) criteria and not according to the E-OCVM as for other Key Features:

SESAR Solution ref.	SESAR Solution Title	Delivery timing <sup>21</sup>	
		2018	2019
PJ.14-01-01	CNS environment evolution		TRL2
PJ.14-02-01	FCI Terrestrial Data Link		TRL4
PJ.14-02-02	Future Satellite Communications Data link		TRL4
PJ.14-02-04	FCI Network Technologies incl. voice solutions & military interfacing	TRL2	TRL4
PJ.14-02-05	Development of new services similar to FIS-B to support ADS-B solutions for General Aviation	TRL2	TRL4
PJ.14-02-06	Completion of AeroMACS development		TRL6
PJ.14-03-01	Advanced GBAS cat II-III operations (e.g. offset touchdown)		TRL4
PJ.14-03-02	Multi Constellation / Multi Frequency (MC/MF) GNSS		TRL4
PJ.14-03-04	Alternative Position, Navigation & Timing (A-PNT)	TRL2	TRL4
PJ.14-04-01	Surveillance Performance Monitoring		TRL4
PJ.14-04-03	New use & evolution of Cooperative & Non-Cooperative Surveillance		TRL4
PJ.15-01	Sub-regional Demand Capacity Balancing Service	TRL4	TRL6 ongoing
PJ.15-02	Delay Sharing Service	TRL4	TRL6 ongoing

<sup>21</sup> This information has been aligned with the Extended Release Strategy established with the support of the Programme Committee in Q3 2017

SESAR Solution ref.	SESAR Solution Title	Delivery timing <sup>21</sup>	
		2018	2019
PJ.15-08	Trajectory Prediction Service		TRL4
PJ.15-09	Data Centre Service for Virtual Centres		TRL6
PJ.15-10	Static Aeronautical Data Service	TRL4	TRL6 ongoing
PJ.15-11	Aeronautical Digital Map Service	TRL4	TRL6 ongoing
PJ.16-03	Work Station, Service Interface Definition & Virtual Centre Concept	TRL4	TRL6
PJ.16-04	Workstation, Controller productivity	TRL2	TRL4
PJ.17-01	SWIM TI Purple Profile for Air/Ground Advisory Information Sharing	TRL4	TRL6
PJ.17.03	SWIM TI Green profile for G/G Civil Military Information Sharing	TRL2	TRL4
PJ.17-08	SWIM TI Common runtime registry	TRL4	TRL6
PJ.18-01a	Addressed the technical part of "Mission Trajectory Driven Processes"	TRL4	TRL6
PJ.18.01b	Mission Trajectories in TBO		TRL2
PJ.18-02a	Trajectory-based operations		V1
PJ.18-02b	Flight object interoperability		TRL6
PJ.18-02c	eFPL supporting SBT transition to RBT		TRL6
PJ.18-04a	Improved AIM Information		TRL6
PJ.18-04b	Improved MET Information		TRL6
PJ.18-04c	Improved use of MET and AIM in Cockpit		TRL4
PJ.18-06a	ATC Planned Trajectory Performance Improvement		TRL6
PJ.18-06b	Tactical and NM Trajectory performance improvement		TRL4

**Table 10: Solutions delivery within the Key Feature 'Enabling Aviation Infrastructure' in the period 2018-2019**



#### **2.4.2 IR Wave 2 (currently planned for the period from 2019 to 2021) – Call with reference H2020-IBA-SESAR-2019-1**

The IR Wave 2 Call has a launch targeted in early 2019 and execution taking place during the period 2019-2021 (subject to the successful completion of the grant award procedure and of the grant agreement signature procedure). In preparation for this, during the year 2018, the SJU will carry out activities required to define the content of the IR Wave 2 Call. These activities are described in section III chapter 2.1.

This second IR Call (within the restricted Call with reference H2020-IBA-SESAR-2019-1 also covering VLD activities) will enable the flexibility needed to align future research with the results of Wave 1, re-assess relative priorities and ensure the best value-for-money for the EU and delivery against SES goals. This Call will also allow for the completion of those Solutions which have not planned to be delivered to V3 within Wave 1, allow for strategic input to scope new projects from the Master Plan update as well build on results of the outcome of Exploratory Research projects from ER1 Call to increase the maturity of the research towards future solutions.

The total available funding for the Wave 2 Call is EUR 151,5 million, covering both IR and VLD activities<sup>22</sup>, with an indicative amount of EUR 128,9 million for IR. The exact allocation of funding is under work and will be further defined in the SPD 2019-2021.

The objective is to launch the Call in early 2019 and perform the evaluation of the proposals, the selection and the grant awards by the end 2019. This approach enables the launch into execution of the Wave 2 IR projects during Q4 2019 and the delivery of Wave 2 SESAR Solutions during the year 2020 and currently planned through to the year 2021. IR Wave 2 is intended to be the last Call for Industrial Research & Validation, when it is anticipated that all SESAR 2020 IR budget will be consumed. In 2019 and 2020, taking account of the outcome of the IR/VLD Wave 2 Call, the SJU will analyse the gap between the expected Industrial Research & Validation results and the objectives set by the Master Plan for the SESAR 2020 Programme in relation to Industrial Research & Validation, and plan for necessary actions.

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<sup>22</sup> However, it should be noted that this Call may be launched without the availability of the related commitments in accordance with the budget profile available today

## 2.5 Strategic Area of Operation 4: Deliver Very Large-Scale Demonstration activities (VLD)

Very Large Scale Demonstrations are designed to help bridge the gap between the development and deployment phases of the SESAR programme, and not to replace either type of activity. VLDs use early versions of end-user systems and include the integration of new technology elements into existing systems when needed and possible. As such, VLDs will mostly derive from work matured through earlier phase of Industrial Research & Validation.

Very Large-Scale Demonstrations are conducted by the SJU Members and as such subject to restricted Calls for proposals, or by other entities through open Calls for proposals. VLD activities are run under six Calls and have an overall direct funding (Title III related to grant agreements) of EUR 107,6 million, broken down as it is depicted in the figure below. The exact amount of each Call is to be confirmed, especially to take into account the results of the grant amendment procedure on grants established under the restricted Call with reference H2020-SESAR-2015-2 in 2017 and 2018. The procedure to define the Wave 2 Call with reference H2020-IBA-SESAR-2019-1 is described in section III paragraph 2.1.2., and the conditions for the Call with reference CEF-SESAR-2018-1 are provided in section III paragraph 2.6.1.2. In addition, a proportion of SJU running costs (Title I and Title II) is used to carry out the Very Large-Scale Demonstration activities. The overall funding of Strategic Area of Operation #4 (Very Large-Scale Demonstration activities) for the period from 2018 to 2020 is indicated in Annex I.

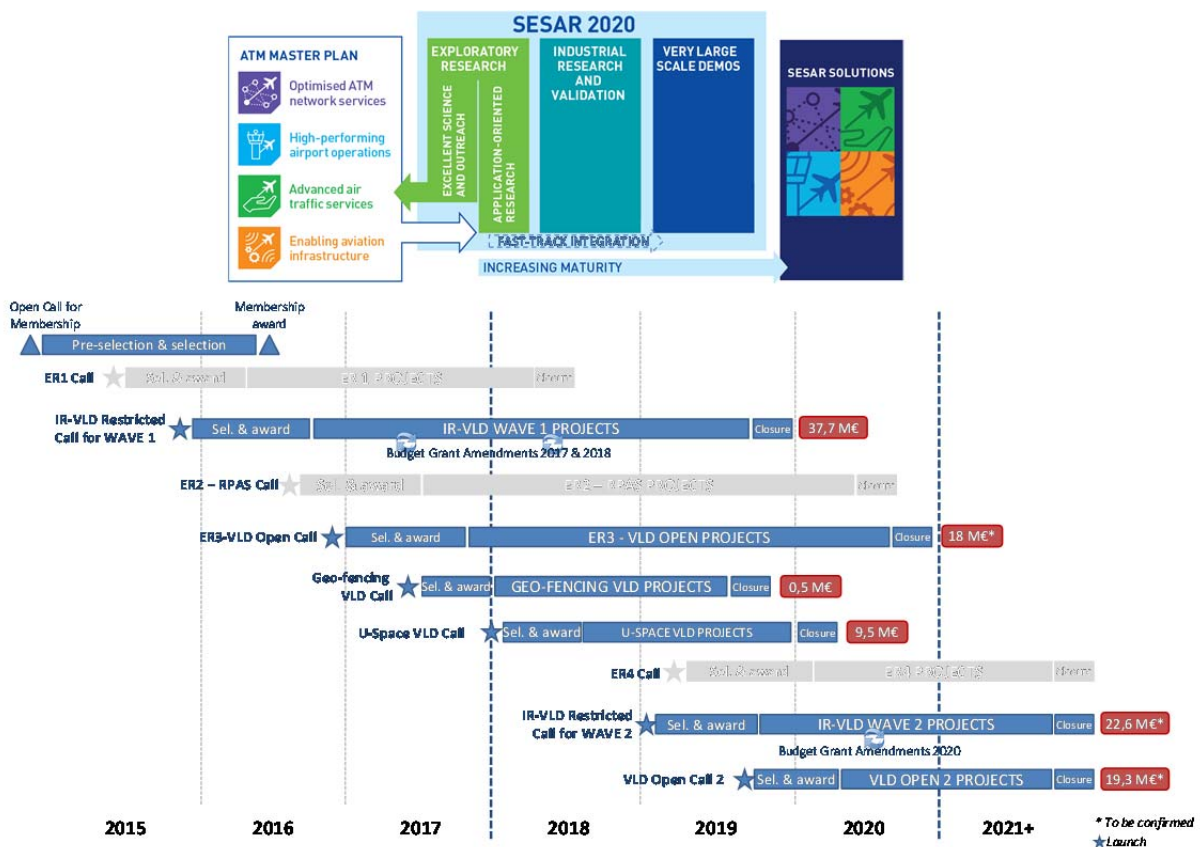


Figure 13: Sequence of VLD Calls and related funding 2015-2021

Therefore, during the period 2018-2020, the SJU will, in the context of Very Large-Scale Demonstration activities:

- Supervise, then close the activities stemming from Wave 1 VLD and the VLD Open Calls (with reference H2020-SESAR-2015-2 and H2020-SESAR-2016-2 respectively) , as well as the related grant agreements,
- Sign the agreement with the awarded beneficiary following the evaluation of proposals received in response to the Geo-fencing VLD Call (with reference SESAR-2017-1), then launch and supervise the related activity,
- Launch a third open Call focusing on U-space ('U-space Call' with reference CEF-SESAR-2018-1) in early 2018, then run the evaluation of proposals received in response, award the grants and sign the related agreements, then launch and supervise the related activities; these activities are expected to close by Q1 2020;
- Plan and organise the call procedure for Wave 2 projects;
- Plan (in 2018) and execute (in 2019-2020) the transfer of results of Wave 1 into Wave 2 VLD activities and Open VLD activities (see activities related to the transition from Wave 1 to Wave 2 in section III chapter 2.3).

As introduced in section II chapter 3.2, in addition to direct funding (Title III), the SJU also dedicates a proportion of its running costs (Title I and Title II) to carry out the Very Large-Scale Demonstration activities. The overall funding of Strategic Area of Operation #4 is indicated in Annex I.

As outlined in the SESAR 2020 Programme research topics presented in the introduction to chapter 2, Very Large-Scale Demonstration activities cover the four Key Features of the ATM Master Plan as well as other high priority policy areas<sup>23</sup>:

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<sup>23</sup> This list of activities must be complemented with the projects stemming from the Open VLD call (with reference H2020-SESAR-2016-2) for which the grant agreements have to be signed by end 2017

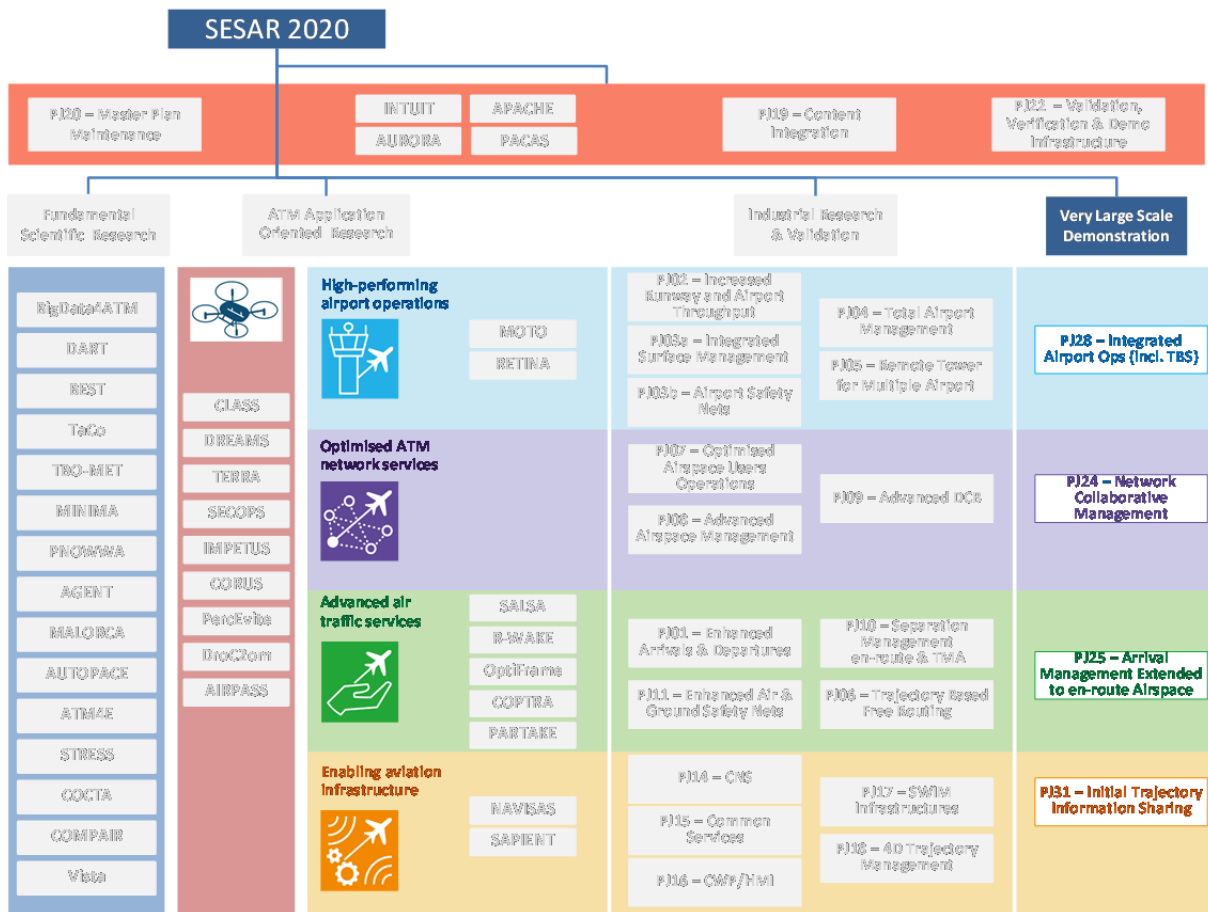


Figure 14: Very Large-Scale Demonstration work breakdown structure as at end 2017<sup>24</sup>

Within VLD, the SESAR 2020 programme will comply with all provisions of H2020 Work Programme 2016-2017. However, it should be noted that the SESAR 2020 programme will deliver results through the SESAR Solutions and not project by project. Therefore, it is not necessary for all VLD activities to provide open access for all data, and VLD activities will opt out of the provisions of Annex L of 20. General Annexes related to open access to research data (see European Commission Decision C(2016)4614 of 25 July 2016). This opt-out also aims to protect results that are expected to be commercially or industrially exploited.

### 2.5.1 Calls already closed and projects already launched at end 2017

#### 2.5.1.1 VLD Wave 1 (2016-2019) – Call with reference H2020-SESAR-2015-2

In the period 2018-2019, and in continuation with the activities in the period 2016-2017, VLD activities will be conducted through four activities covering the four Key Features, taking into account that two projects (PJ.23 and PJ.26) were not awarded as a result of the Call and that one project (PJ.27) is being terminated in 2017. These projects are expected to deliver the following outcomes in 2019:

<sup>24</sup> Compared to the figure presented in previous Single Programming Documents, VLD activity PJ27 ‘Flight Information Exchange’ is not appearing as it has been terminated in 2017 following recommendation of the Programme Committee

VLD activity ref.	Wave 1 VLD deliverables	2018	2019
PJ.24	Demonstration Plan for Network Collaborative Management considering the Network Manager, Air Navigation Services, Airports and AUs Flight Operation Centres	X	
	Demonstration Report for Network Collaborative Management considering the Network Manager, Air Navigation Services, Airports and AUs Flight Operation Centres		X
PJ.25	Demonstration Plan for Arrival Management extended to En-Route Airspace	X	
	Demonstration Report for Arrival Management extended to En-Route Airspace		X
PJ.28	Demonstration Plan for Integrated Airport Operations	X	
	Demonstration Report for Integrated Airport Operations		X
PJ.31	Demonstration Plan for ATM Improvements Generated by Initial Trajectory Sharing (Extended Projected Profile)	X	
	Demonstration Report for ATM Improvements Generated by Initial Trajectory Sharing (Extended Projected Profile)		X

**Table 11: Deliverables of Very Large-Scale Demonstration projects in 2018 and 2019**

### 2.5.1.2 VLD Open Call – Call with reference H2020-SESAR-2016-2

To complement the previous Call for proposals restricted to SJU Members, an open Call related to Very Large-Scale Demonstration activities ('Open VLD Call' within the Call with reference H2020-SESAR-2016-2) was launched at the end of 2016. Eight grant agreements<sup>25</sup> are expected to be signed as a result of this Call, each delivering a Demonstration Plan and a Demonstration Report within indicative project duration of 2 years grants awarded in that context. As indicated in the 2016 Annual Work Plan and Single Programming Document 2017-2019, and subject to the completion of the call procedure and successful awards of grants by end 2017, these Very large-Scale Demonstration activities will cover<sup>26</sup>:

- **Arrival Management Extended to En-Route Airspace** - The Arrival Management (AMAN) extended to en-route extends the AMAN horizon from 100-120 NM to 180-200 NM from the arrival airport, allowing traffic sequencing to be conducted in the en-route and early descent phases. The arrival constraint generated by the extended AMAN takes into account the different flows of arrival flights delivered by different neighbouring ACCs and this information is passed to two or more upstream ACCs.
- **Integrated Airport Operations** - addressing efficient provision of approach and aerodrome control services through improved both runway safety and throughput and optimised surface

<sup>25</sup> A total of sixteen grant agreements are expected to be signed under the call with reference H2020-SESAR-2016-2 comprising both ER and Open VLD

<sup>26</sup> The topic 'Efficient services and infrastructure delivery' initially foreseen as part of the Call was not covered by received proposals

operations. This encompasses advanced departure management procedures and tools, enhanced surface management including planning and routing, and the use of ground safety nets to monitor routing conformance, detect conflicting clearances and deliver alerts to the controller.

- **Network collaborative Management** – addressing cooperative traffic management environment based on the exchange, modification, and management of trajectory information in both pre-departure and execution phases of the flight in order to improve the European Network performance, particularly capacity and flight efficiency. It consists in optimising the delivery of traffic in sectors and airports while assessing accurately the capacity needs corresponding to the traffic demand. It includes an enhanced evaluation of the demand through identification of hotspots and assessment the traffic complexity and the proposal of appropriate ATFCM solutions which integrate multiple local dynamic capacity balancing (DCB) constraints.
- **Initial Trajectory Information Sharing** - the trajectory will become the standard for ATM and requires to be regularly updated and shared among involved stakeholders including ANSPs/ACCs and network management. This is a first step which is expected to bring already significant improvement in flight efficiency and particularly predictability. It consists in equipping an adequate number of mainline aircraft and assessing technical and operational impact of downlinking trajectory information contained in the FMS during commercial flights.
- **Increased access to airports for low visibility mixed fleet operations** – a great number of European airports are not equipped with advanced ground infrastructure that allows Cat II/III procedures in bad weather conditions and especially in low visibility conditions (particularly true but not limited to medium and small size airports). This topic addresses the use of advanced on-board equipment as well as GNSS (such as EGNOS) to support safe airport access for mixed fleet operations including Business Aviation as well as Mainline.
- **Global applications for trajectory based flow and queue management using EPP extended into Oceanic/Inter-continental operations** – addresses the use of aircraft derived from EPP information in a simulated and/or live environment to improve operational applications for ATS/ATC- traffic synchronisation and ATFM purposes with a specific emphasis on global interoperability. It may also include demonstrations on technical feasibility and benefits of using satellite communications during the entire flight to exchange trajectory information.
- **Global applications for improved flight trajectories using SWIM B2B services** – building on the results achieved in previous SWIM global demonstration activities, this topic addresses the use of specific SWIM services for improved flight planning, flight briefing and flight following through global interoperability. This encompasses in particular pre-departure flight plan information that could be exchanged in an agreed standard but also other kind of B2B services relevant during the execution of the flight.
- **Solutions for General Aviation and Rotorcraft** – addresses specific solutions linked to SESAR concepts using non certified on-board equipment and shall demonstrate the benefits of such solutions regarding the improvement of situation awareness and safety. Although demonstrations are expected to occur in class G airspace, they should be geared to the possible extent, at building confidence for safe integration of GA and rotorcraft operations in all classes of airspace.
- **Safe integration of drones** – safe integration of drones in the airspace has to be considered in the relevant context according to mission type, altitude, class of airspace and type of drone. This topic addresses demonstrations to build confidence on solutions that would support the safe integration of drones in all classes of airspace (including Very Low Level Operations) and that could be deployed at a larger scale within the next 5-8 years. Particular



focus should be put on solutions enabling the following mission types: long range surveying (primarily BVLOS), light load movement (primarily BVLOS) and long endurance surveying (primarily at altitudes above 150 metres).

After the grant agreement preparation phase is completed, the Open VLD activities will progressively be launched into execution in the beginning of 2018.

### **2.5.1.3 Geo-fencing VLD Call – Call with reference H2020-SESAR-2017-1**

A specific Call related to geo-fencing VLD activities was launched in 2017 through European Commission / Parliament funds in accordance with the standard EC Financial Regulation/Rules and managed in the SJU Accounts as Assigned Revenue. This Call scope focuses solely on Active Geofencing Service and fills the gap with activities conducted under the previous Call (VLD Open Call with reference H2020-SESAR-2016-2) in the topic of “Safe integration of drones” in relation with geo-fencing. It covers a specific Preparatory Action of the European Parliament. It is targeting demonstrations of web-based Geofencing solutions that use location signals to prevent drones from flying in no-fly zones.

Subject to the successful completion of the grant agreement preparation activities in the beginning of 2018, the SJU is looking to award 1 project in this purpose, with a maximum duration of 2 years (2018-2019), complementing work done in the context of the Call H2020-SESAR-2016-2 on the topic ‘Integrating Remotely Piloted Aircraft Systems (RPAS) in the European airspace using an Active Geofencing Service (AGS)’ – see previous paragraph. In finalising the scope of this Call the SJU shall take into consideration the outcome of Call H2020-SESAR-2016-2. This will ensure that any gaps can be targeted and opportunities explored in order to make the most of the limited funding available.

## **2.5.2 Other future call activities on Exploratory Research to be carried out in the period 2018-2020: ER4 Call with reference H2020-SESAR-2019-2**

### **2.5.2.1 U-Space Call (2018-2019) – Call with reference CEF-SESAR-2018-1**

In light of discussions held in June 2017 with the Commission, the SJU has been mandated to manage a Call under the Connecting Europe Facility (CEF) programme for a value of EUR 9,5 million, related to the performance of a number of large-scale demonstrations to validate systems that support U-space services against the relevant requirements and standards: the U-space demonstration Call with reference CEF-SESAR-2018-1<sup>27</sup>.

This Call will be an open Call to complement ongoing U-space activities, speed up U-space deployment and stimulate close cooperation with EASA, standardisation bodies and industry including newly emerging stakeholders.

Further detail on this Call can be found in section III chapter 2.6.1.

### **2.5.2.2 VLD Wave 2 and VLD Open 2 Calls (currently planned for the period 2019-2021) – Calls with references H2020-IBA-SESAR-2019-1 and H2020-SESAR-2019-3**

Similarly to the Industrial Research & Validation, in 2018 two Calls for proposals related to VLD will be in preparation: one restricted to the Members of the SJU (VLD Wave 2, as part of the Call with reference H2020-IBA-SESAR-2019-1 to be launched in early 2019) and one open (Call with reference

<sup>27</sup> See delegation agreement EC/SESAR JU ref. MOVE/E3/DA/2017-564/si2.771010 signed on 13/12/2016

H2020-SESAR-2019-3 to be launched by end 2019). Execution of projects under these Calls will take place during the period 2019-2021.

In preparation for this, during the year 2018, the SJU will carry out activities required to define the content of the VLD Wave 2. These activities are described in section III chapter 2.1.

The VLD Wave 2 Call should focus on the SESAR Solutions delivered in the Industrial Research & Validation Wave 1. The objective is to launch this Call in early 2019 as part of the IR/VLD restricted Wave 2 Call (see 2.4.1.2). The total available funding for the Wave 2 Call, covering both IR and VLD activities, is EUR 151,5 million, with an indicative amount of EUR 22,3 million for VLD. The exact allocation of funding is under work and will be further defined in the SPD 2019-2021.

The second VLD Call in 2019 will be launched in Q3, with grant awards targeted in Q1 2020 and grant signature in Q2 2020. This Call is intended to be the last Call for Very Large-Scale Demonstrations, when it is anticipated that all SESAR 2020 VLD budget will be consumed. In 2019 and 2020, taking account of the overall outcome of the VLD Calls, the SJU will analyse the gap between the expected VLD results and the objectives set by the Master Plan for the SESAR 2020 Programme in relation to Very Large-Scale Demonstrations, and plan for necessary actions.



## 2.6 Strategic Area of Operation 5: Deliver SESAR Outreach

In addition to the above, and in accordance with the Founding Regulation of the SJU, wider stakeholder engagement with public and private sector organisations as well as with European States and the International Civil Aviation Organisation (ICAO) will be very important for the SJU tasks of definition (Master Plan) and development (SESAR 2020) in the period. Collaboration and outreach will therefore be further enhanced to secure stakeholder engagement (in particular with European Airports, Airspace users, Professional Staff Organisations and National Authorities and EASA).

As introduced in section II chapter 3.2, in addition to direct funding (from Title II and Title III), the SJU also dedicates a proportion of its running costs (from Title I and Title II) to carry out the SESAR Outreach activities. The overall funding of Strategic Area of Operation #5 is indicated in Annex I.

The fact that the SJU and its R&I programme follow the Aviation Strategy under Single European Sky, embedding the full ATM modernisation life cycle, now acknowledged as a sound approach of working together and supported by the ATM community, also means that the level of expectations and importance increases and it becomes even more critical to successfully disseminate and communicate deliveries than was the case in SESAR 1. In addition, the fact that the SJU carries the responsibility of successfully delivering a well updated European ATM Master Plan based on an even wider view of the Air Transport and Aviation community is now well recognised in Europe and in the rest of the world. The current plan of ICAO to develop a similar structure with three levels for the ICAO/GANP is evidence to this effect and also means the SJU must prepare for and deliver an effective outreach strategy as a consequence.

One of the keys for delivering a successful SESAR Outreach is the continued focus on the main issues of global interoperability and harmonisation. The goal is to achieve a performance increasing ATM modernisation that ensures the involvement of the stakeholders on the right topics at the right time. The outreach strategy will embed the message of globally interoperable standards where and when needed and harmonisation where and when necessary with the focus of minimising risk in implementations of performance increasing solutions. The other key for a successful SESAR Outreach is to continue to focus on securing and maintaining SESAR's current global leadership in aviation and ATM by promoting SESAR solutions and subsequent standards development thereby helping increase the global market share for European air transport, aviation and ATM industry.

Collaboration with other ATM modernisation programmes will be growing in both detail and numbers as the visibility of SESAR support and alignment to the ICAO GANP/ASBUs context increases. SESAR Outreach will continue within the EU's external aviation policy framework, which means that international outreach according to the cooperative arrangements already agreed will be further developed. SESAR will, in close coordination with the EC, continue to conclude cooperative arrangements with several states and regions that request coordination with SESAR on ATM modernisation towards global interoperability and harmonisation.

The SJU will also continue to further develop the ongoing close collaboration with the U.S. FAA/NextGen Programme and to further strengthen the links with Standard Making Organisations like EUROCAE, RTCA etc. to support standardisation with SESAR material and by doing so ensuring alignment of priorities in relation to SESAR 2020, the ATM Master Plan, industry standards developments and the evolution of ICAO provisions.

It is equally important to continue to push for the SESAR ATM modernisation aim of representing the full R&I life cycle from definition, securing the bridging between innovative research through

industrial developments and validations/demonstrations (SESAR 2020) all the way to and including preparation for deployment of SESAR Solutions.

As a consequence, the already established collaboration strategy shall be continued. It will be further enhanced to secure the European Air Transport and Aviation stakeholder engagement and overall commitment to the Master Plan and the development work addressed in SESAR 2020 in close collaboration with the PCP implementations in the SESAR Deployment Programme. Therefore, the close collaboration with the SESAR Deployment Manager will develop accordingly to fully articulate and connect the full SESAR life cycle.

The demand for disseminating and communication of SESAR solution results will continue to increase and the format of dedicated publications will play an important role of creating insight and transparency of the work of the SJU and its Members. General events participation as well as focussed SJU-led events jointly organised with European and global partners will similarly be a crucial element necessary to promote SESAR Solutions and gather experiences, viewpoints and priorities of the global community together with the SJU Members and stakeholders.

Finally, in the period, the already close cooperation with other EU Agencies will develop to enable and enhance coordinated contributions to the Aviation Strategy.

## **2.7 Strategic Area of Operation 6: Deliver effective financial, administrative and corporate management**

Management and administrative services are brought together primarily under this area of operation to ensure that core horizontal activities of the SJU are planned, implemented, monitored and reported in a coherent and consistent way to facilitate efficient and effective delivery of SJU's work programme and to ensure sound financial & resource management. The effectiveness of the organisation based on the mission, vision and the values of the SJU will also continue, aligning the capabilities of the organisation, technology and the extensive competencies of its human capital in order to maximise its added value.

For that aim, in the period 2018-2020, the SJU will continuously align operational and strategic planning as well as capabilities of the organisation to best serve stakeholders' needs, ensuring full regulatory compliance with H2020 reporting obligations and ensure production of relevant and accurate management information. The SJU's Internal Audit Capability function will continue to objectively examine, evaluate and report on the adequacy of SJU's internal controls as a contribution to the proper, economic and effective use of its resources.

Furthermore, in an effort to continuously align resource allocation to strategic priorities through the introduction of industry best practices and standards, the SJU will identify key business areas and processes that need improvement, diagnose and analyse the reasons behind poor performance, plan and implement changes necessary to improve performance in a quantifiable or measurable way.

Developing and maintaining a strong corporate culture and a positive image to its stakeholders and the EU institutions, the SJU will promote a positive image of the SJU through effective communication and leadership and through effective external communications (including through legal and statutory reporting obligations).

Finally, the SJU will retain and continuously develop its staff through robust knowledge and skills management.

As introduced in section II chapter 3.2, the SJU dedicates a proportion of its running costs (from Title I and Title II) to carry out the financial, administrative and corporate activities. The overall funding of Strategic Area of Operation #6 is indicated in Annex I.

### 3 Human and financial resource outlook for years 2018-2020

#### 3.1 Overview of the past and current situation

At the end of 2016 and during 2017, in line with the situation reported in 2016, the number of human resources in the Staff Establishment Plan is 44 positions of which 39 Temporary Agents, 3 SNEs and 2 Contract Agents positions assigned to activities performed during the SESAR 1 - SESAR 2020 transition period for the years 2016 and 2017 (Function Group IV - temporary reinforcement of the SJU capacities in the Financial, the Legal and the Procurement areas).

For detailed data on the different staff categories, please refer to annex III table 1.

Similarly, the situation of expenditure has remained overall stable in 2016 and 2017, with an increase of Title III expenditure due to the launch of SESAR 2020 operational activities (see chapters 2.1 to 2.4 related to Strategic Areas of Operations 1 to 4 in the Single Programming Document for 2017-2019):

	Executed Budget 2016 (in Euros)	Budget 2017 (in Euros) <sup>28</sup>
Title I	6.191.500	6.160.000
Title II	4.058.500	4.180.351
Title III	88.823.761	103.005.914
<b>TOTAL</b>	<b>99.073.761</b>	<b>113.346.265</b>

Table 12: SESAR JU financial resource outlook for 2016 and 2017

#### 3.2 Resource programming for the years 2018-2020

##### 3.2.1 Human resources

In 2018, in comparison to the 2017 situation, the number of human resources in the Staff Establishment Plan will decrease from 44 to 42 staff of which 39 Temporary Agents and 3 SNEs. This decrease of 2 positions was planned and already described in the Single Programming Document for 2017-2019: it concerns staff that were assigned to activities performed during the SESAR 1 - SESAR 2020 transition period for the years 2016 and 2017.

The positions requested for 2018-2020 remain thus in total **39 Temporary Agent positions** filled by personnel recruited under the following types of contracts: TAs contracts for positions requesting long-term duration contracts, and CAs contracts for some administrative support functions.

In addition, the Administrative Board authorized **3 Seconded National Experts** positions where Member States' experience is requested. This expertise from the Member States air transport administrations will remain across the period 2018 - 2020 in the area of Master Planning, Regulatory Affairs and ATM.

<sup>28</sup> As per Single Programming Document 2017-2019 after Amendment 2 to Annex XII "Budget 2017" of the amended consolidated SESAR JU Single Programming Document 2017-2019 adopted by Written Procedure on the 8 November 2017

For detailed data on the different staff categories, please refer to annex III table 1.

### 3.2.2 Financial resources

#### 3.2.2.1 Revenues<sup>29</sup>

In accordance with the Regulation extending the SJU and implementing financing over the perspective 2014-2020, an overall funding of EUR 585 million is available from H2020 research funds. In addition, the SJU has been entrusted,

- under delegation agreement EC/SESAR JU ref. MOVE/E3/DA/2016-669/SI2.743803 signed on 06/12/2016<sup>30</sup>, a EUR 500.000 assigned revenue to organise a Call for proposals for a geofencing demonstration,
- under delegation agreement EC/SESAR JU ref. MOVE/E3/DA/2017-477/SI2.766828 signed on 10/11/2017, an additional EUR 800 000 assigned revenue expected by end 2017 from the Commission to procure a study to develop a proposal for the future architecture of the European airspace, and
- under delegation agreement EC/SESAR JU ref. MOVE/E3/DA/2017-564/si2.771010 signed on 13/12/2016, an additional EUR 10 million assigned revenue is expected by end 2017 from the Commission from the Connecting Europe Facility (CEF) funds to organise a Call for proposals on a U-space demonstration.

#### 3.2.2.2 Expenditure

For the period 2018-2020, once SJU running costs are taken into account, the overall expenditure is EUR 383,4 million, broken down as follows:

	Budget 2018 (in Euros)	Budget 2019 (in Euros)	Budget 2020 (in Euros)
Title I	6.040.300	6.044.372	6.157.360
Title II	3.476.234	3.612.935	3.417.079
Title III	143.921.427	108.390.450	102.294.156
<b>TOTAL</b>	<b>153.437.961</b>	<b>118.047.757</b>	<b>111.868.595</b>

**Table 13: SESAR JU financial resource outlook for 2017 and 2018**

Title I (Staff) and Title II (Administrative) expenditure are maintained at comparable levels to previous years for 2018-2020 with the exception of the 2 Contract Agents positions which will no longer appear by the end of 2018 (see annex I table 28 and annex III). All Title II budget lines are kept practically at the same level of 2017 for 2018-2020.

The anticipated evolution of both staff and budget allocations for the period 2018–2020 is presented in Annexes II and III. The overall expenditure budget of the SJU in the period 2018-2020 in commitment appropriations is broken down as follows:

<sup>29</sup> EU contribution for 2018 is subject to the adoption of the DB 2018 by the budgetary authority, and EU contribution post 2018 is indicative figure subject to the outcome of future budgetary procedures

<sup>30</sup> In accordance with Articles 54(2)(a) and 58(1)(c)(iv) of the Financial Regulation

Strategic Area of Operations	Types of procedures	Call and support activities budget <sup>31</sup>
Strategic Areas of Operation 1– Strategic Steering	Restricted H2020 Calls for proposals Procurement of support services Procurement of studies (to be confirmed)	EUR 12,5 million
Strategic Area of Operation 2 – Exploratory Research	Open H2020 Calls for proposals	EUR 46,4 million
Strategic Area of Operation 3 – Industrial Research & Validation	Restricted H2020 Calls for proposals Procurement of support services	EUR 231 million
Strategic Area of Operation 4 – Very Large-Scale Demonstrations	Open and Restricted H2020 Calls for proposals Open CEF call (to be confirmed) Procurement of studies Procurement of support services	EUR 80,4 million
Strategic Areas of Operation 5 – SESAR Outreach	Procurement of support services	EUR 6 million
Strategic Areas of Operation 6 – Deliver effective financial, administrative and corporate management	Procurement of support services	EUR 7,1 million
<b>TOTAL</b>		<b>EUR 383,4 million</b>

**Table 14: SESAR 2020 operational expenditure outlook for the period 2018-2020**

### 3.2.2.3 Budget outturn and cancellation of appropriations

Budget outturns are the result of the fact that all EU resources in terms of commitments were received by the SJU by the end of 2014 and these resources will cover, together with the resources from the other Members in the years 2015-2017, the commitments of the SJU for Title I, II and III in each of the subsequent years 2015-2017.

The 2016 surplus that remains within the joint undertaking is EUR 37,043 million.

Given the multi-annual nature of SESAR I and SESAR 2020, and in line with the SJU Financial Rules, cancelled appropriations may be entered in the estimates of revenue and expenditure up to the following three financial years. Therefore the commitment appropriations unused by year end 2016 will be cancelled in 2017. The payment appropriations unused by year end 2016 for Title 1 and 2

<sup>31</sup> From overall SESAR 2020 financial contributions



were carried forward automatically (RAL) and any appropriations left after closure of the contractual obligations will be cancelled in 2017 (see annex II table 3).



## Section III – Work Programme 2018<sup>32</sup>

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### 1 Executive summary

In 2018, the SJU will continue through SESAR 2020 to steer and manage the innovation pipeline delivered by the ATM community –its renewed membership as well as research and demonstration organisations – under the H2020 framework. This includes:

- Exploratory Research projects resulting from the ER1 (H2020-SESAR-2015-1), ER2-RPAS (H2020-SESAR-2016-1) and ER3 (2020-SESAR-2016-2) Calls for proposals, and management of the related grant agreements,
- IR and VLD projects under the Wave 1 (H2020-SESAR-2015-2), the 2016 VLD Open Call (H2020-SESAR-2016-2) and the 2017 Geofencing Call (SESAR-2017-1), and management of the related grant agreements, including the grant budget amendment procedures for the Wave 1 Call,
- The execution of Release 8 in line with the Release Plan published in 2017, and start of the planning and preparation of Release 9 to be concluded in 2019,
- The launch of the dedicated Call on U-space in early 2018 under CEF funding (CEF-SESAR-2018-1)<sup>33</sup>, its award and the management of the related grant agreements,
- The planning and preparation of
  - the restricted Call for Wave 2 for IR and VLD- – which will be launched in early 2019 (H2020-IBA-SESAR-2019-1),
  - the ER4 open Call – which will be opened in early 2019 (H2020-SESAR-2019-2),
  - the second VLD Open Call – which will be opened in Q3 2019 (H2020-SESAR-2019-3);
- The execution of a study to develop a proposal for the future architecture of European airspace<sup>34</sup>.

In addition, the SJU will process payments in accordance with the financial circuit for the grant agreements where reporting periods become due and/or projects close their work and final payment is due.

The next scheduled significant update of the Master Plan will also take place in 2018. The maintenance and execution of the European ATM Master Plan, as defined in the SJU Regulation, is central to the SJU as the agreed roadmap driving the modernisation of the Air Traffic Management system and connecting SESAR R&I with deployment. It is the key tool for SESAR providing the basis for timely, coordinated and efficient research and deployment of new technologies and procedures.

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<sup>32</sup> The content of the SPD annual work programme section includes the required content of a Work Plan as referred to in Article 16(1)(b) of Council Regulation (EC) No 219/2007 as amended. This term corresponds to the term "work plan" defined in Article 2(1)(22) of Regulation (EU) No 1290/2013 of the European Parliament and of the Council of 11 December 2013 laying down the rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)" ('Rules for Participation Regulation No 1290/2013') (OJ L 347, 20.12.2013 p.81): "the document similar to the Commission work programme adopted by funding bodies entrusted with part of the implementation of Horizon 2020 in accordance with Article 9(2) of Regulation (EU) No 1291/2013"

<sup>33</sup> See delegation agreement EC/SESAR JU ref. MOVE/E3/DA/2017-564/si2.771010 signed on 13/12/2016

<sup>34</sup> See delegation agreement EC/SESAR JU ref. MOVE/E3/DA/2017-477/SI2.766828 signed on 10/11/2017



Stakeholder engagement beyond the Members is critical to the successful delivery of SJU's mandated goals. As such, there will be a continuing need to embed a strategic and systematic approach to civil and military stakeholder engagement and management across the SJU in 2018. To do this, the SJU will continue to engage in partnerships with relevant actors in order to foster operational and policy coherence and to influence policies and actions that can have a positive benefit on the execution of SJU's mandate and that of its main stakeholders. Such partnerships will include, inter alia, EU institutions and decentralised bodies, ICAO, other regional R&D programmes, standardisation bodies and other third-party organisations. SJU will also continue to undertake effective outreach through the delivery of clear, targeted and effective communications on the SJU's activities to all its external stakeholders, increasing the visibility, credibility and accurate understanding of the SJU's work and mandate, leading to a significantly increased visibility of the SJU as an important stakeholder in the modernisation of the European air traffic management (ATM) system. Interaction with the European GNSS Agency (GSA) will also be strengthened in order to assure coordination on activities relevant for the EU GNSS (EGNOS/Galileo).

During the course of the year, the SJU will also continue to align the capabilities of the corporate services elements of its organisation to support the delivery of SESAR 2020 project and activities. The objective for the SJU in 2018 is the continued development and consolidation of SJU support processes, with an emphasis on further developing their efficiency and effectiveness in line with best practices, standards and applicable regulatory frameworks.

Regarding the SESAR 1 programme, the SJU will proceed with financial management and closure activities, especially payments in relation with the final Financial Statements, and will complete work undertaken in 2017 related to the archiving of important information. Ex-post audit activities are also expected to take place on the SESAR 1 programme in 2018.

Due to activities related to the SESAR 1 – SESAR 2020 transition coming to an end, human resources will be reduced by 2 contract agent positions in the course of 2018.

## 2 Activities in 2018

In this chapter, each Strategic Area of Operation is described with a focus on activities to be conducted in 2018, associated with objectives, indicators and the 2018 targets/metrics.

All the SJU activities will be supervised the Administrative Board (see above in section II paragraph 2.1.5) which planning to hold three meetings during 2018. The key decisions and documents to be adopted during the course of 2018 are expected to be the following:

Provisional Timetable for key ADB Activities & Decisions in 2018	
Q1	Adopt operating decisions required for 2018 and beyond
	Adopt decision on Internal Audit Capability Work Plan
	Adopt decision on Voting rights allocation
Q2	Appointment of Board vice-chairperson
	Adopt decision on the CAAR 2017 & its assessment by the ADB
Q4	Adopt decision on Final Accounts 2017
	Adopt the 2019 Single Programming Document

Table 15: Provisional Timetable for key ADB Activities & Decisions in 2018

### 2.1 Strategic Area of Operation 1 (operational activity): Provide Strategic Steering to the SESAR programme

In 2018, the SJU will, in the context of Steering activities:

- Supervise those projects launched under the Wave 1 Call, and manage the related grant agreements, conduct the second grant budget amendment campaign (see below),
- Plan, organise and prepare the call procedure for the three Calls for proposals: the IR/VLD Wave 2 Call (with reference H2020-IBA-SESAR-2019-1), the ER4 Call (with reference H2020-SESAR-2019-2) and the VLD Open 2 Call (with reference H2020-SESAR-2019-3), in view of launching the Call in the beginning of 2019 and enabling the award of the grants in the second quarter of 2019 (see below for further information on the process set up by the SJU),
- Plan the transition between ER1, ER2-RPAS, ER3 and IR Wave 1 on one side, and ER4, IR-VLD Wave 2 and VLD Open 2 on the other side, in content, in process and in timing (see below),
- Conduct the Master Plan update campaign - subject to confirmation through the Administrative Board (see below),
- Conduct EC support activities in relation with the Common Project 2 proposal and the Airspace Architecture study.

#### 2.1.1 Grant budget amendment

The grant budget amendment process is described in paragraph 2.6.1.1 below.

### 2.1.2 Planning and preparation of the ER4, IR-VLD Wave 2 and VLD Open 2 Calls for proposal and Wave 1 – Wave 2 IR-VLD transition

As specified in the Multi Annual Work Programme (MAWP)<sup>35</sup>, the end of actions (also referred to as “projects” in this document) under the first series of Calls for proposal is scheduled between mid-2018 (for projects and grants under ER1), the end of 2019 (for projects and grants under IR/VLD Wave 1) and 2020 (for ER2-RPAS and ER3). In order to complete SESAR 2020 Programme research and innovation objectives, the SJU plans to launch three new Calls for proposals in 2019, referred to as “ER4”, “IR/VLD Wave 2” and “VLD Open 2”. These Calls for proposals will lead to grant signature and actions to be in execution from late 2019 (IR/VLD Wave 2), Q1 2020 (ER4) and mid-2020 (for VLD Open 2) onwards. ER4 and VLD Open 2 are open Calls for proposals, while IR/VLD Wave 2 will be restricted to the SJU Members. Figure 6 in section II provides an overview of the Calls sequence and the underlying projects and grants timelines.

While ER4 will further explore current or explore new research topics, IR Wave 2 will further develop key Solutions identified in the ATM Master Plan to prepare further industrialisation. VLD Wave 2 and VLD Open 2 activities will further demonstrate new mature Solutions, with a primary focus on those which are part of the Common Project 2 proposal (referred to as ‘CP2’, see SJU Single Programming Document 2017-2019 for further information).

All future Calls for proposals content will cope with the SESAR vision articulated according to 6 themes: automation support, integration of all vehicles, flight- and flow-centric operations, integrated systems, sharing of information, virtualisation. Attention will be paid, in the definition of the Calls specifications and in the evaluation procedure, to take into account the outcome of the ATM Master Plan 2018 update that will drive future R&D activities towards more disruptive Solutions that present potential to deliver a step-change towards a more digital future for aviation. These themes are more of a transversal nature. These themes refine and implement the ATM Master Plan identified priorities and performance objectives.

As per Article 1.5 of the SJU Founding Regulation<sup>36</sup>, the SJU is responsible for “*coordinating and concentrating all relevant research and development efforts in the Community*” and “*ensuring the supervision of activities related to the development of common products duly identified in the ATM Master Plan, through grants to Members and through the most appropriate measures, such as procurement or the award of grants following calls for proposals to achieve the programme objectives, in accordance with Regulation (EU) No 1291/2013*”<sup>37</sup>. For this purpose, the SJU:

- concluded with its Members a specific Membership Agreement where rules of cooperation between the SJU and its Members<sup>38</sup> as well as rules of governance of the SESAR Project were agreed<sup>39</sup>, and

<sup>35</sup> The Multi-Annual Work Programme was adopted by the Administrative Board in 2015 (decision [ADB\(D\)-05-2015](#))

<sup>36</sup> Article 1.5 of Council Regulation (EC) 219/2007 of 27 February 2007, as modified by Council Regulation (EC) 1361 / 2008 (SJU Regulation) and last amended by the Council Regulation (EU) 721/2014

<sup>37</sup> Regulation (EU) No 1291/2013 of the European Parliament and of the Council of 11 December 2013 establishing Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020) and repealing Decision No 1982/2006/EC

<sup>38</sup> Section B Article 3 of the Membership Agreement: “*The parties shall work and cooperate together to the best of their abilities with a view of implementing SESAR 2020 in a correct, efficient, open and timely manner and of attaining the objectives and the deliverables as envisaged by the ATM Master Plan*”

- may benefit from the unique expertise of its members and thus “award grants to its Members, in accordance with the applicable financial regulations”<sup>40</sup>.

On this basis, over 2018, the SJU will follow a clear and coordinated procedure for defining the technical content of the forthcoming SESAR Project activities and prepare the resulting Calls for proposals to be launched in 2019. This procedure – to be adopted by the SJU Administrative Board prior to the initiation of these activities and in accordance with Article 5 (m) of SJU Statutes, will detail the Advisory Bodies consultation process (see also the chapter related to Governance in section II), breakdown the preparation stages of these activities as well as allocate clear roles and responsibilities, with a view to ensuring that the topic development is aligned to scientific objectives and not subject to undue influence<sup>41</sup>.

Topics to be addressed in the IR/VLD Wave 2, ER4 and VLD Open 2 Calls for proposals will be defined and prioritised by the SJU in the course of 2018, following on first definition started in 2017 and building on the initial plans documented in the Multi-Annual Work Programme (MAWP).

The phasing of the calls definition and preparation can be depicted as follows:

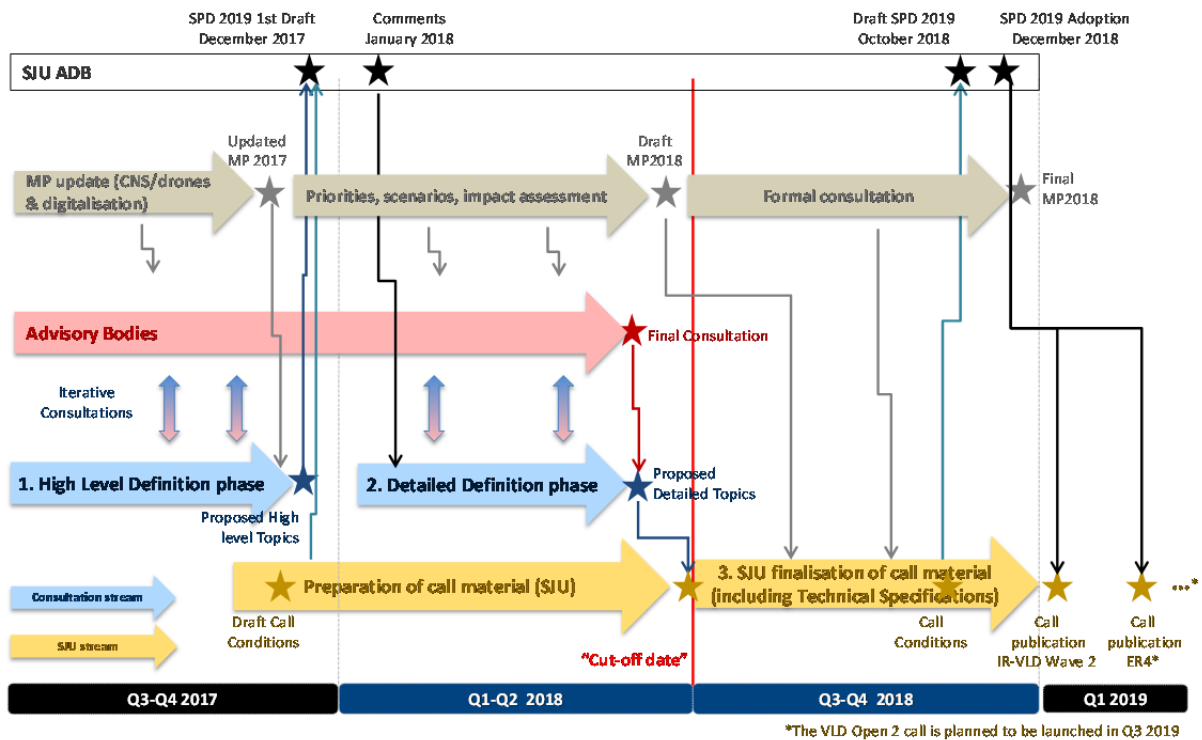


Figure 15: Preparatory activities leading to the achievement of the ATM Master Plan objectives for the SESAR 2020 Programme (technical perspective)

<sup>39</sup> Appendix E of the Membership Agreement foresees that the Programme Committee will provide “strategic guidance and make recommendations with regard to the management of the Programme to ensure the alignment with the ATM Master Plan”

<sup>40</sup> Article 9.1 of the SJU Statutes annexed to Council Regulation (EC) 2019/2007 of 27 February 2007, as modified by Council Regulation (EC) 1361/2008 (SJU Regulation) and last amended by the Council Regulation (EU) 721/2014

<sup>41</sup> The importance of this information was highlighted in the report of the Internal Audit Services on H2020 Grant Process audits performed in Joint Undertakings (13 June 2017)

The common sources of inputs for the definition of the Calls for proposals are the EU policy orientations as defined in the EU Aviation Strategy and the Master Plan that will be updated in 2018 (see paragraph 2.1.3).

The phasing of activities for each Call preparation and the related sources of inputs are further detailed in the following paragraphs.

1. “High-Level Definition” consists in identifying the Topics to be addressed in each Call. During this phase, the consultation with the Advisory Bodies (as defined below for the various Calls) will be based on getting comments on the draft SPD document, with the main objectives to ensure the scientific relevance of the proposed Topics and to prepare the review and adoption of the SPD by the SJU Administrative Board.

At this stage, Topics will be defined in the draft SPD 2019-2021 (submitted for review by the Administrative Board at the end of 2018) in the form of a list and short description of Topics (at this stage, not at Solutions or Projects level) together with other call conditions, namely, for each open Call:

- Reference to the basic act and the budgetary line,
- Overall Call budget (at this stage, indicative),
- Type of Action and related funding rate,
- High-level budget allocation per Topic (at this stage, this should remain at the level of Key Features and remain indicative),
- Application of the H2020 Work Programme 2018-2020 General Annexes,
- Call timeline,
- Eligibility, selection and award criteria (in relation with the Type of Action).

2. Subsequently, for each Call, the “Detailed Definition” phase will consist in further defining the different Topics (at the level of the Solutions for the VLD open Call) and the related proposed co-financing level. To do so, the SJU will take into consideration the comments from the Administrative Board in the beginning of 2018 on the draft SJU SPD 2019-2021 which will contain the High-Level topics (see above). Furthermore, detailed definition will be done with the support of the Advisory Bodies, as defined below.

The Detailed Definition phase will lead to a proposed list of Topics and proposed budget allocation by mid-2018. Call conditions will not be addressed in the Detailed Definition phase as they are not subject to Advisory Bodies consultation but to review and adoption by the Administrative Board through the SPD 2019-2021.

3. Subsequently, in mid-2018, the SJU will close the consultation with its Advisory Bodies (“cut-off date”). It will open the “Finalisation of call material” phase, conducted in total isolation, where a final prioritisation exercise on the selected Topics and Solutions will be run, in order to finalise the Calls technical specifications.

Close coordination with the outcome of the Master Plan update campaign (see below) and with Common Project 2 will be required to ensure consistency and get a top-down performance view and disruptive solutions driven approach allowing prioritisation of the Solutions by the SJU. These

Solutions, in relation with IR/VLD, will have to be considered against the planned available budget. The Master Plan Committee will support the SJU for this coordination by reviewing and providing performance-driven feedback on the proposed Topics at the end of the Detailed Definition phase.

The final call conditions will be documented in the Single Programming Document 2019-2021 (with target adoption date in Q4 2018) and will serve for the financing decision authorising the launch of the Calls and the use of the dedicated budget.

Based on the call conditions adopted through the SPD 2019-2021 and on the technical material established through previous steps, the material required for launching the Call based on the H2020 requirements (including technical specifications, execution framework, proposal templates, call conditions and evaluation procedure, etc.) will be prepared by the SJU by end 2018.

### **2.1.2.1 Planning and preparation of the open Calls for proposals to be launched in 2019 (ER4 and VLD Open 2)**

In addition to the sources of inputs mentioned above, specific sources of inputs will be used for each open Call:

- For the ER4 Call: Topics will be selected from results of ER1 and new concepts based on advice from the Scientific Committee, with additional analysis of the wider ATM scientific community including ACARE and the proceedings of the SESAR Innovation Days,
- VLD Open 2 Call based on results stemming from Wave 1 results and required for CP2 Solutions.

For these Calls, the phasing of activities applies as follows.

1. “High-Level Definition” will be conducted by the SJU and include the consultation with the Scientific Committee and Master Planning Committee.

2. In the “Detailed Definition” phase, the support of the Advisory Bodies will consist in:

- the Scientific Committee for ER4, and for the inclusion of ER1 results into IR/VLD Wave 2. The Scientific Committee involvement in the Detailed Definition phase focuses on providing comments on the scientific relevance of the
  - Topics definition for ER & VLD,
  - New technological trends, disruptive solutions,
  - Integration with and leverage of previous SESAR 2020 projects results and outcome;
- the Master Planning Committee (MPC) for the VLD Open 2 Call. The MPC involvement in the Detailed Definition phase focuses on comments, in particular on the scientific relevance and performance ambition of the
  - Topics definition for VLD, especially in view of securing the timely delivery of Solutions in relation with the 2018 update of the ATM Master Plan and with CP2,
  - Proposed Topics prioritisation and link with EU political priorities, Master Plan, performance scheme (top-down perspective) and CP2.

3. Subsequently, in mid-2018, the SJU will close the consultation with its Advisory Bodies (“cut-off date”).

### 2.1.2.2 Planning and preparation of the restricted IR/VLD Wave 2 Call

In addition to the sources of inputs mentioned above, specific sources of inputs will be used for the IR/VLD Wave 2 Call:

- New topics resulting from ER ATM application-oriented research results,
- Definition of priorities of Wave 1 results requiring further development, subject to analysis based on performance-driven criteria (i.e. Solutions not completed at the end of Wave 1 will not automatically be migrated into Wave 2),
- VLD based on Wave 1 results and required for CP2 Solutions;

1. In the “High-Level Definition”, the generic process described above applies for the IR/VLD Wave 2 Call preparation.

2. In the “Detailed Definition” phase, for the Wave 2 Call, the support of the Advisory Bodies will consist in:

- the Scientific Committee for the inclusion of ER1 results into IR/VLD Wave 2. The Scientific Committee involvement in the Detailed Definition phase focuses on providing comments on the scientific relevance of the
  - Topics definition for IR & VLD,
  - New technological trends, disruptive solutions,
  - Integration with and leverage of previous SESAR 2020 projects results and outcome;
- the Programme Committee and, as required, its sub-committees (DMSC and OTSC). The PC involvement in the Detailed Definition phase focuses on comments, in particular on the scientific relevance and performance ambition of the
  - Topics definition for IR & VLD, especially in view of securing the timely delivery of Solutions in relation with the ATM Master Plan and with CP2,
  - Proposed Topics prioritisation and link with EU political priorities, Master Plan, performance scheme (top-down perspective) and CP2,
  - Proposed effort allocation per Topic.
- the Master Planning Committee (MPC). The MPC involvement in the Detailed Definition phase focuses on comments, in particular on the scientific relevance and performance ambition of the
  - Topics definition for VLD, especially in view of securing the timely delivery of Solutions in relation with the 2018 update of the ATM Master Plan and with CP2,
  - Proposed Topics prioritisation and link with EU political priorities, Master Plan, performance scheme (top-down perspective) and CP2.

### 2.1.3 Master Plan update campaign: activities to be conducted in 2018

Considering the pressing need to foster and support the potential of the drone market in the EU, maintaining high EU standards for Europe's industry to grow, expand and compete globally, the next significant update of the European ATM Master Plan is now scheduled for 2018. This update will be particularly important to drive and secure investments beyond 2020 in a context of increased pressure on the EU budget, and to address in more detail the crucial issues of drones, cybersecurity, spectrum and incentives mechanisms as tools to support deployment.



In such context, the campaign towards the 2018 update of the Master Plan will address the requirements of the Commission Decision on the adoption of the Master Plan Edition 2015 and will embrace and support several of the key elements of the EC Aviation Strategy:

- Tapping into growth markets, by improving services, market access and investment opportunities,
- Embracing a new era of innovation and digital technologies,
- Tackling limits to growth in the air and on the ground, by reducing capacity constraints and improving efficiency and connectivity, including connection of regions to the network,
- Promote an interoperable approach to transport,
- Maintaining high EU safety and security standards, by shifting to a risk and performance based mind-set,
- People-focused solutions, reinforcing the social agenda and creating high quality jobs in aviation,
- Contributing to a resilient Energy Union and a forward-looking Climate Change Policy.

Recognising the flagship role of SESAR in driving EU's aviation innovative agenda and that digitalisation and automation are rapidly transforming all sectors of the global economy, the overall theme of this campaign will be framed under "the digitalisation of aviation", building on the SESAR Vision already outlined in 2015. This update shall therefore provide a unique opportunity for business leaders, policy makers, and researchers to confirm that SESAR's vision is "future-proof".

Taking into account the above background and also the recommendations from the Administrative Board for next campaign when adopting the 2015 Edition, the following objectives constitute the success criteria for the 2018 campaign:

1. Reflect the state of SESAR implementation and achievements, including through CPs, showing progress towards the Vision and Performance Ambitions,
2. Provide the critical path for rolling out SESAR, with particular attention to the CNS roadmaps,
3. Drive priorities for future SESAR Calls for proposals,
4. Ensure comprehensive coverage of all needs related to the safe integration of drones.
5. Shape the European position to drive the global agenda for ATM modernisation at ICAO level.
6. Strengthen convergence between Performance Scheme and SESAR.
7. Reassess impact of SESAR on the EU economy, employment and mobility, including the social impact of changes or costs related to early phasing out of current infrastructure.

#### 2.1.4 Indicators and measurements applicable for the Strategic Area of Operation 1

2018 Objectives	Indicators	Target 2018
<b>Call reference H2020-SESAR-2015-2 (IR –VLD Wave 1 Call): Wave 1 Transversal Activities projects delivery of results</b>	Percentage of Wave 1 Transversal Activities (PJ.19, PJ.20, PJ.22) having performed a project mid-term review	100% of Transversal Activities have performed a project mid-term review



2018 Objectives	Indicators	Target 2018
<b>Call reference H2020-SESAR-2015-2 (IR –VLD Wave 1 Call): conduct Wave 1 Transversal Activities grant budget amendments campaign</b>	Percentage of Wave 1 second grant budget amendments concluded	100% of second Wave 1 grants amended budget completed
<b>Execute the Master Plan Update Campaign</b>	Delivery of the Master Plan 2018	Master Plan 2018 approved by ADB before year end
<b>Strengthen coordination with relevant Master Plan stakeholders</b>	Continued coherence between all 3 levels of MP	At least 2 meetings of the Master Planning Committee held
<b>Prepare ER4, Wave 2 and VLD Open 2 Calls for proposal for launch in 2019</b>	Content of ER4, Wave 2 and VLD Open 2 Calls finalised and approved by the SJU Administrative Board, taking account of <ul style="list-style-type: none"> <li>The results of ER1 projects,</li> <li>The results of IR Wave 1 projects and the delivered SESAR Solutions</li> </ul>	100% of ER4, Wave 2 and VLD Open 2 Calls content expectations available and approved by the Administrative Board by 31/12/2018  Calls ready for launching in early 2019
	Wave 1 – Wave 2 transition process ready for execution in 2019	All process documentation available through the SJU Quality Management System after coordination with SJU advisory bodies
<b>Call reference H2020-IBA-SESAR-2019-1 (IR/VLD Wave 2 Call): preparation of content and Call material for Transversal Steering activities</b>	Preparation for IR/VLD Wave 2 Call launch finalised for Transversal Steering activities	100% of IR/VLD Wave 2 Call material ready by 31/12/2018 for Transversal Steering activities and approved as part of the SPD 2019-2021  Call ready for publication and opening in early 2019
<b>Provide support to EC on other areas linked to the technological pillar of the SES</b>	Requested reports are provided to the EC in time and with the right level of quality	Develop the proposal on the future architecture of European airspace (Airspace Architecture study final report delivered to the Commission in due time and before year end)  Secure timely delivery and support on Common Project 2 definition  Conduct the study on critical analysis of the European CNS infrastructure (TBC)

Table 16: Objectives, indicators and 2018 targets for Strategic Steering activities

## 2.2 Strategic Area of Operation 2 (operational activity): Deliver Exploratory Research

In 2018, the SJU will, in the context of Exploratory Research activities:

- Supervise projects under the ER1 and ER2-RPAS Calls and manage the related grant agreements, then launch the closing procedure of ER1 projects ,
- Launch, then supervise the projects under the ER3 Call (with reference H2020-SESAR-2016-2), as well as the related grant agreements; this is subject to the successful conclusion of the selection and award procedure in 2017,
- Under guidance and within the overall framework defined in Strategy Area of Operation 1, carry out activities required to define the content of the ER4 Call.
  - Identification of new trends to be addressed , as part of or in complement to the ER topics introduced in section II chapter 2.1 (figure 6),
  - Integration of ER Fundamental Research results from ER1 Call into the Application-Oriented Exploratory Research agenda, associated with Key Features,
  - Selection of the top priority topics to be addressed in the ER4 Call and definition of the technical selection and award criteria,
  - Definition of budget allocation per topic,
  - The conditions of ER4 will be documented in the Single Programming Document 2019-2021,
  - The overall call material will be prepared by the SJU after consultation of the Scientific Committee.

Accordingly, in addition to those specific ER deliverables outlined within the multi-annual section of the SPD, the SJU has identified a number of other objectives to be delivered during 2018 which are outlined in the table below:

2018 Objectives	Indicators	Target 2018
<b>Call reference H2020-SESAR-2015-1 (ER1 Call) projects execution: delivery of results</b>	Percentage of ER1 projects having performed a project closure	100% of ER1 projects performed a project closure
<b>Call reference H2020-SESAR-2016-1 (ER2 – RPAS Call) projects execution: delivery of results</b>	Percentage of ER2-RPAS projects having performed a project mid-term review	80% of ER2-RPAS projects performed a project mid-term review
<b>Call reference H2020-SESAR-2016-2 (ER 3 Call) projects execution: delivery of initial results</b>	Percentage of ER3 projects having their PMP approved by SJU	100% of ER3 projects have their PMP approved by the SJU
<b>Call reference H2020-SESAR-2019-2 (ER 4 Call): preparation of content and call material</b>	Preparation for ER 4 call launch finalised	100% of ER 4 Call material ready by 31/12/2018 and approved as part of the SPD 2019-2021  Call ready for publication and opening in early 2019

**Table 17: Objectives, indicators and 2018 targets for Exploratory Research**



Furthermore, in 2018 and in continuation with activities conducted in the previous years, the SJU will organise the Young Scientist Award: the annual prize of EUR 5.000 to be awarded to the successful young scientist applicant resulting from an open call.



### 2.3 Strategic Area of Operation 3 (operational activity): Deliver Industrial Research & Validation

In 2018, the SJU will, in the context of Industrial Research and Validation activities:

- Supervise those projects launched under the Wave 1 Call, as well as the related grant agreements, in particular through the finalisation of the Release 7, the execution of the Release 8 and the preparation of Release 9, then launch the closing procedure of those projects,
- Conduct the second grants budget amendment campaign for IR Wave 1 projects,
- Under guidance and within the overall framework defined in Strategy Area of Operation 1, carry out activities required to define the content of the IR Wave 2 Call, in view of opening the Call in the beginning of 2019 and enabling the award of the grants in the second part of 2019:
  - Integration of ER1 Call Application-oriented research results into the Wave 2 topics,
  - Selection of the top priority topics to be addressed in the IR Wave 2 Call and definition of the technical selection and award criteria,
  - Definition of budget allocation per topic,
  - The conditions of the IR Wave 2 Call (restricted) will be documented in the Single Programming Document 2019-2021<sup>42</sup>,
  - The overall call material will be prepared by the SJU after consultation of the Programme Committee.

In addition to those specific deliverables outlined within the corresponding multi-annual section, the SJU has identified a number of other objectives to be delivered during 2018 which are outlined in the table below:

2018 Objectives	Indicators	Target 2018
<b>Finalise validation exercises of Release 7 and draft final report</b>	Percentage of Release 7 completed in 2018	100% Release 7 Solutions validation exercises completed  Release 7 Final Report available before year end
<b>Execute validation exercises of Release 8</b>	Percentage of Release 8 completed in 2018	At least 50% Release 8 Solutions validation exercises completed in 2018
<b>Prepare Release 9</b>	Preparation of Release 9 Plan	Release 9 Plan available and approved with Programme Committee by year end
<b>Call reference H2020-SESAR-2015-2 (IR –VLD Wave 1 Call): Wave 1 projects delivery of results</b>	Percentage of Wave 1 having performed a project mid-term review	100% of projects have performed a project mid-term review

<sup>42</sup> For this call, the SJU will comply with all provisions of H2020 Work Programme 2018-2020. However, IR projects will opt out of the provisions of Annex L of 20. General Annexes related to open access to research data (see European Commission Decision C(2016)4614 of 25 July 2016). This opt-out also aims to protect results that are expected to be commercially or industrially exploited. See paragraph 2.5.2 for further information on this opt-out

<b>Call reference H2020-SESAR-2015-2 (IR –VLD Wave 1 Call): conduct Wave 1 IR grant budget amendments campaign</b>	Percentage of Wave 1 second grant budget amendments concluded	100% of second Wave 1 grants amended budget completed
<b>Call reference H2020-IBA-SESAR-2019-1 (IR Wave 2 Call): preparation of content and call material</b>	Preparation for IR/VLD Wave 2 Call launch finalised	100% of IR/VLD Wave 2 call material ready by 31/12/2018 and approved as part of the SPD 2019-2021  Call ready for publication and opening in early 2019

**Table 18: Objectives, indicators and 2018 targets for Industrial Research & Validation**

## 2.4 Strategic Area of Operation 4 (operational activity): Deliver Very Large Scale Demonstration Activities

In 2018, the SJU will, in the context of Very Large-Scale Demonstrations activities:

- Supervise those projects launched under the Wave 1 and 2016 Open Calls, as well as the related grant agreements, then launch the closing procedure of those projects,
- Conduct the second grants amendments campaign for Wave 1 VLD activities,
- Sign the grant agreement subsequent to the award of the VLD Geofencing Call (with reference SESAR-2017-1),
- Plan, organise, prepare and launch the call procedure for the U-Space Call (with reference CEF-SESAR-2018-1), then evaluate the received proposals and award the grants, then run the grant agreement preparation phase and sign the grant agreements, launch the activities into execution and supervise the execution phase of these activities; call conditions are defined in paragraph 2.6.1.2 below;
- Under guidance and within the overall framework defined in Strategy Area of Operation 1, carry out activities required to define the content of the VLD Wave 2 and second VLD Open Calls, in view of opening the Call in the beginning of 2019 (Wave 2) and Q3 2019 (Open Call) and enabling the award of the grants in the second part of 2019 (Wave 2) and Q2 2020 (Open Call):
  - Integration of IR Wave 1 results into the demonstration agenda,
  - Selection of the top priority topics to be addressed in the Calls, and definition of the technical selection and award criteria,
  - Definition of budget allocation per topic,
  - The conditions of the VLD Wave 2 Call (restricted) and the second Open VLD Call will be documented in the Single Programming Document 2019-2021<sup>43</sup>,

<sup>43</sup> For this call, the SJU will comply with all provisions of H2020 Work Programme 2018-2020. However, it should be noted that the SESAR 2020 programme will deliver results through the SESAR Solutions and not project by project. Therefore, it is not necessary for all IR projects to provide open access for all data, and VLD projects will opt out of the provisions of Annex L of 20. General Annexes related to open access to research data (see European Commission Decision C(2016)4614 of 25 July 2016). This opt-out also aims to protect results that are expected to be commercially or industrially exploited

- The overall calls material will be prepared by the SJU after consultation of the Programme Committee and the Master Plan Committee.

In addition to those specific deliverables outlined within the corresponding multi-annual section, the SJU has identified a number of other objectives to be delivered during 2018 which are outlined in the table below:

2018 Objectives	Indicators	Target 2018
<b>Call reference H2020-SESAR-2015-2 (IR –VLD Wave 1 Call): Wave 1 VLD activities delivery of results</b>	Percentage of Wave 1 VLD activities having performed a project mid-term review	100% of Wave 1 VLD activities have performed a project mid-term review
<b>Call reference H2020-SESAR-2015-2 (IR –VLD Wave 1 Call): conduct Wave 1 VLD grant budget amendments campaign</b>	Percentage of Wave 1 second grant budget amendments concluded	100% of second Wave 1 grants amended budget completed
<b>Call reference H2020-SESAR-2016-2 (VLD Open Call): delivery of initial results</b>	Percentage of VLD Open Call activities having their PMP approved by SJU	100% of VLD Open Call activities have their PMP approved by the SJU
<b>Call reference H2020-SESAR-2017-1 (VLD Geofencing Call): grant agreement signature and launch of the project</b>	Geofencing project launched in execution in 2018	Geofencing Call grant agreement signed  Geofencing project launched in execution in 2018
<b>Call reference CEF-SESAR-2018-1 (U-space Call) launch, evaluation and award</b>	Call procedure leading to the signature of the targeted number of grant agreements (see Call conditions in paragraph 2.6.1)	All U-Space Call grant agreements signed before year end  U-Space activities in execution in Q3 2018
<b>Call reference H2020-IBA-SESAR-2019-1 (VLD Wave 2 Call): preparation of content and call material</b>	Preparation for VLD Wave 2 Call launch finalised	100% of VLD Wave 2 Call material ready by 31/12/2018  Call ready for publication and opening in early 2019
<b>Call reference H2020-SESAR-2019-3 (second VLD Open Call): Call preparation</b>	Preparation for second VLD Open Call launch finalised	Call conditions for Open VLD Call ready by 31/12/2018 and approved as part of the SPD 2019-2021  Call ready for publication and opening in Q3 2019

**Table 19: Objectives, indicators and 2018 targets for Very Large-Scale Demonstrations**

## 2.5 Strategic Area of Operation 5 (operational activity): Deliver SESAR Outreach

Communication and events play an integral role in engaging with and informing the wider air transport community about the SJU's work and results while encouraging wider international commitment to the SES approach to ATM modernisation as well as contributing to maintaining the momentum around the SESAR project.

### 2.5.1 Communication and promotion activities

In 2018, SJU communication activities will support the activities of SESAR 2020 through the application of the following targeted objectives, in accordance with SJU 2015-2020 Communications Strategy:

- Continue to regularly illustrate and showcase SESAR solutions that are mature and ready for industrialisation and deployment, showing tangible benefits for the air transport industry and society as a whole;
- Continue the awareness and outreach activities on SESAR directly with stakeholders and at European and Global events/conferences to promote SESAR results securing European and global stakeholders knowledge and commitment;
- Promote SESAR as an integral part of the 'day-to-day' air transport and ATM domain, both in Europe and globally;
- Enhance the arrangements of the SJU with its Members;

To meet these objectives, the SJU Strategy & External Affairs area will carry out the following activities:

- Promote and market the SESAR brand, the benefits that can be realised through SESAR Solutions and the availability of industrial products to deliver results in international fora, both in Europe and other regions including ICAO;
- Create and disseminate appropriately targeted printed materials and digital communications in general and as needed based on SESAR 2020 project results and specifically in relation to the events listed below;
- Provide effective press and media outreach.

The following main events/conferences are currently foreseen for 2018:

What	When	Where	Who	Exhibition Y/N
<b>U-Space INFO Day</b>	January – date TBC	Brussels – EC to host	Interested applicants for U-Space Call	N
<b>Singapore Air Show (Aviation Leadership Summit)</b>	6-9 February 2018	Singapore	Aviation Community/General Public	Y
<b>Single Sky Committee (SSC): Mini Showcase</b>	13-14 March 2018	EC	Member States	Y – 10 SJU projects & VR tool
<b>SESAR JU Internal Meeting</b>	5 March 2018	Madrid	SESAR Community	N

<b>World Congress</b>	<b>ATM</b>	6-8 March 2018	Madrid	ATM Community		Y (shared with DM)
<b>Transport Arena (TRA)</b>	<b>Research</b>	15-18 April	Vienna	European Community	Research	Y (linked with EC stand)
<b>ILA Berlin (Berlin Air Show)</b>		25-29 April 2018	Berlin	Aviation Community /General Public		Y (shared with DM)
<b>SESAR/NextGen Conference</b>		June – TBC	Washington (TBC)	US aviation community		N
<b>Solutions Workshop</b>		Date TBC – mid September 2018	TBC - An airline	ATM institutions	Community/EU	Y – possibly coupled with demo. The SDM will also co-host this event.
<b>ICAO ANC 13</b>		9-19 October 2018	Montreal	Aviation community		Y – possibly with the other SES partners
<b>Master Plan 2018 - SESAR moving towards digitalisation</b>		Q3-Q4 2018	TBD	Aviation community		Y – possibly coupled with another event
<b>SESAR Innovation Days 2018</b>		November 2018 (date TBC)	Leuven (TBC)	ATM Scientific Community – and political community		Y – small stand

**Table 20: Major events and conferences foreseen by SJU in 2018**

Various other conferences and events organised by the EU, European and international stakeholders will require SESAR participation with speakers, workshops or stands and beyond standard list.

Furthermore, as part of the SJU Communication activities and together with events and conferences presented above, the following represents the publications/digital communications/on-line communications and communications coordination currently foreseen for 2018:

<b>Publications</b>	<b>When</b>
Drone addendum	Q1 2018
Application of SESAR 2020 visual identity (print material: posters, visual graphics, printed material)	Q1-Q4 2018
2017 Highlights	Q1 2018
Promotional material for the World ATM Congress	Q1 2018
Promotional material for the Solutions Workshop	Q3 2018
State of Harmonisation	Q3 2018
European ATM Master Plan	Q4 2018



Digital communication	When
SESAR Solutions AR experience	Q1 2018
2018 Highlights	Q4 2018
Online communication	When
E-news (Interviews and project news)	10 e-news per annum
Contributions to external magazines	12-16 articles per annum
Press relations	Q1-Q4 2018
Social media campaign #digital aviation	Q1-Q4 2018
Social media campaign #womeninaviation	Q1 2018
Communications coordination	When
Review SESAR 2020 project plans and activities	Q1-Q4 2018
Maintain and improve STELLAR content for Communications Coordination Group	Q1-Q4 2018
Organise webex and face-to-face meetings with Coordination Group	Q1-Q4 2018

**Table 21: Main publications and communication activities in 2018**

### 2.5.2 Dissemination and information about projects results

The SJU will systematically collate and disseminate data from completed and ongoing projects with the aim of obtaining a comprehensive view of the progress achieved in each financed project against targets outlined in the SJU's annual and multi-annual work plans. Such data collection will enable a holistic view of SESAR 2020 activities and their impact. Output from projects, such as standardisation material, publications and patents, will be made available on the SJU website (either through uploaded documents or links to relevant websites) as well as direct dissemination of material to the appropriate bodies in support of preparation for deployment. Information on H2020 Calls for proposals and projects will continue to be made available through the H2020 portal and other H2020 reporting mechanisms. In addition, the SJU will continue to publish and promulgate SESAR Solutions once available and validated through the Release process.

The SESAR 2020 programme will comply with all provisions of the H2020 programme. However, while ER projects will comply with all the provisions of H2020 Annex L related to open access to research data, as explained in paragraphs 2.2.2 and 2.2.3 IR and VLD projects may opt out of these provisions in order to protect results that are expected to be commercially or industrially exploited. In addition, the justification for project-by-project opt-out by IR and VLD projects can be further reinforced due to the nature of Complementary Grants awarded; meaning that collective results (SESAR Solutions) shall be published and accessible rather than individual project by project results. This process is coordinated and put in place by the SJU.

### 2.5.3 Stakeholder Engagement

A fundamental principle of the SJU is to broaden and deepen collaboration with a range of different stakeholders in order to benefit from their expertise and gain their assurance that SESAR Solutions meet the needs of the entire European and global ATM and air transport community and deliver the

performance benefit required under SES policy. The fact that such a wide range of stakeholders contribute to the SJU, the Master Plan and the work programme projects and validation activities secures to a large extent the operational inputs necessary and is in line with the users' expectations on the expected deliveries of SESAR solutions. As such, the SJU will in 2018 maintain and enhance the secured third party participation and active input into the SJU tasks of the SESAR Projects Definition (the Master Plan) and Development (SESAR 2020). Over the course of 2018, the SJU will continue to foster strong ties with all European and global key stakeholder groups, the details of which are included below:

- European Airports - under the established specific framework contract the SJU will secure support from all airport categories to the SJU. This includes the provision of expertise for specific airport-related activities. Likewise, the SJU will support airport activities such as roadshows and conferences etc. with SESAR specific inputs for securing awareness, buy-in and commitment;
- Civil Airspace Users - under the specific framework contract the SJU will secure support from the different airspace user categories as well as for the SJU to support airspace user categories in their respective activities agreed relevant and needed to secure, awareness, buy-in and commitment to the SESAR solutions;
- New innovative airspace user entrants in the field of Unmanned Aviation Systems (UAS) will be approached on a case by case basis for finding the most efficient mechanism of cooperation for the benefit of the SJU tasks and activities;
- Professional Staff Organisations - under the MoC the SJU will secure support from the different professional staff associations in the provision of operational expertise across the tasks of the SJU. Moreover, this cooperative arrangement serves to enhance the buy-in of the front-end users to the new ATM developments. Furthermore, the SJU will support the professional staff associations in their respective activities which are agreed, relevant and needed to secure inclusion in developments and commitment to the SESAR solutions;
- National Aviation Authorities (NAAs) - the SJU will work the established Memorandums of Cooperation with the European national authorities (NAA's) to secure support to the SJU from the different national authorities in securing the early involvement and inputs to de-risk SESAR solutions readiness for industrialisation and subsequent deployments;
- European Aviation Safety Agency - The SJU will collaborate under the established Memorandum of Cooperation with the European Aviation Safety Agency to secure early involvement and inputs to the SJU to de-risk SESAR solutions development and readiness for industrialisation and subsequent deployments. The MoC's will at the same time cater for the direct support of the SJU to EASA in activities related to securing the necessary safety, security and regulatory arrangements;
- Clean Sky JU – the established Memorandum of Cooperation caters for sharing of best practices, to identify gaps and secure synergies in areas where a joint approach would be needed in respective development, validation and demonstration activities. The cooperation will also enhance the definition of the performance targets, in particular for environmental targets;
- EUROCAE - the participation of the SJU in the Council and Technical Advisory Committee (TAC) will continue in 2018 along with collaboration with EUROCAE to continue the involvement of SESAR members and the availability of SESAR material in support of standardisation to ensure alignment of priorities in relation to SESAR 2020, the ATM Master Plan and the ICAO GANP;

- ACARE – the SJU participates to the ACARE framework to ensure the appropriate representation of ATM in the European strategic innovation and research agenda and secure the link with Flightpath 2050;
- EASCG - The SJU will further strengthen its involvement in the European ATM Standardisation Coordination Group to ensure that a consistent and credible plan for ATM standards developments is maintained, aligned with the priorities of SESAR 2020, the ATM Master Plan and the ICAO GANP;
- ESCP – The SJU will actively participate in the activities under the EASA led European Strategic Coordination Platform for the coordination of the definition and implementation of the European Strategy for Cybersecurity in Aviation. The SJU experience and know-how on the topic from the work in SESAR 2020 and to align with the priorities in relation to the Master Plan;
- European Defence Agency - the established Memorandum of Cooperation with the European Defence Agency will secure support from the military community (in their roles as ANSP, Airport operator, Airspace user and regulator) to the SJU as well as for the SJU to support the military community through EDA with SESAR specific inputs for securing awareness, buy-in and commitment to the ATM Master Plan and the SESAR 2020 programme. In particular the areas of common interest include the Master Plan, regulations, space-based systems, RPAS integration, cyber-security threats and vulnerabilities to ATM and aviation/ATM standards development;
- European Space Agency – the established Memorandum of Cooperation will allow focusing on strategic cooperation to coordinate roadmaps specifically in relation to the integrated communication, navigation and surveillance (CNS) strategy and the ATM Master Plan, defining the role of satellite communication (SATCOM) as part of the Air Traffic Management (ATM) future enabling infrastructure;
- ICAO - as the ICAO Global Air Navigation Plan evolves requiring support from SESAR we will enhance this collaboration under the EC chairmanship and with the SJU 2020 members in order to prepare for the 2019 update of the GANP/ASBU's, notably through active participation at the Thirteenth ICAO Air Navigation Conference in 2018. The alignment between the ICAO GANP and the ATM Master Plan and SESAR 2020 is crucial to de-risk development towards deployment. The SJU will in this respect continue to coordinate in the European ICAO ATM Coordination Group under the EC chairmanship;
- European GNSS Agency (GSA) – the current informal cooperation framework will be reinforced, by ensuring that all R&D projects with satellite navigation, positioning and timing component will be cross-reviewed, to ensure maximisation of synergies and coherent messages to the industry;
- U.S./FAA/NextGen - the close collaboration with the U.S. NextGen programme will continue with focus on the SESAR full life cycle of definition, development and deployment securing collaboration of not only the FAA but also entities like NASA for exploratory research coordination and RPAS. International harmonisation and global interoperability risks will be further identified and mitigations further refined in order to agree standards and positions towards ICAO provisions;

Other global partners and regions - the existing collaboration agreements either directly with the SJU or indirectly under the European Union agreements covering the ATM domain will be further enhanced during 2018 as the SESAR Solutions evolve and are being deployed. The SJU will work closely with the European Commission and other SESAR Members to identify and leverage opportunities to extend and deepen international collaboration. In doing so, the SJU will follow closely the policies of the EU and the needs of the Aviation Strategy and of the SES framework. There

is a cooperative arrangement planned or in place for activities in 2018 with the following countries: Brazil, China, Japan, Mexico, Singapore, the United Arab Emirates, Qatar, COCESNA.

#### 2.5.4 Indicators and measurements applicable for the Strategic Area of Operation 5

The outcome of these activities will be measured according to the metrics indicated in the 2015-2020 Communications Strategy (e.g. level of participation of stakeholders, website analytics, social media analytics, etc.).

2018 Objectives	Indicators	Target 2018
<b>Strengthen the Global Interoperability activities aligned with EC expectations, especially towards ICAO in close collaboration with U.S. FAA/NextGen and other global modernisation initiatives</b>	<p>Coverage of GANP ASBU modules aligned and agreed with NextGen;</p> <p>State of Harmonisation reflected in the MP Edition 2018 including coverage of GANP ASBU modules;</p> <p>Transparent progress steps towards agreed interoperable and harmonised timelines between SESAR &amp; Next Gen on A/G Data communication protocols, network and applications</p>	<p>Successful SJU input provided to ICAO for ANC/13 in relation to the GANP 2019 update</p> <p>Ambassador role of the Master Plan to be further strengthened.</p> <p>Publish 3<sup>rd</sup> Edition of SESAR/NextGen State of Harmonisation in Q3 2018</p>
<b>Strengthen links towards Standard Making Organisations like EUROCAE, RTCA etc. with the involvement of SESAR members and the availability of SESAR material in support of standardisation.</b>	Alignment of priorities in standards developments with the ATM Master Plan and SESAR 2020 needs	<p>Updated standardisation roadmap;</p> <p>SJU active participation to EASCG, EUROCAE Council and TAC to ensure alignment of the work programmes;</p> <p>SESAR Member/Project contribution to standards development groups.</p>
<b>Strengthen dissemination of SESAR Solutions/demonstrations through SESAR publications, communications events</b>	<p>SESAR dissemination and demonstration events</p> <hr/> <p>SESAR participation to relevant ATM events</p> <hr/> <p>SESAR Publications</p>	<p>See above in table 20</p> <hr/> <p>See above in table 21</p>
<b>Active cooperative arrangement with all European (Member States and Regions), International actors and other modernisation initiatives in Aviation relating to SESAR Definition and Development</b>	- Active cooperative arrangements or agreements with European (Member States and Regions), International actors and other ATM modernisation initiatives	<p>Actors and initiatives to be addressed as priority:</p> <ul style="list-style-type: none"> <li>- NAAs</li> <li>- ACI</li> <li>- Clean Sky JU</li> <li>- EASA</li> <li>- EDA</li> <li>- ESA</li> <li>- European GNSS Agency (GSA)</li> <li>- EUROCAE</li> <li>- ICAO</li> <li>- FAA</li> <li>- Additional third countries as per the list in 2.5.3</li> </ul>

Table 22: Objectives, indicators and 2018 targets for SESAR Outreach

## 2.6 Strategic Area of Operation 6 (transversal activity): Deliver effective financial, administrative and corporate management

This chapter outlines the activities that will be carried out to deliver the objectives of the SJU related to financial, administrative and corporate management. These objectives are summarised in paragraph 2.6.10 and associated with relevant indicators and 2018 targets.

### 2.6.1 Calls and Grants Management

Article 128 of the Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council of 25 October 2012 on the financial rules applicable to the general budget of the Union and repealing Council Regulation (EC, Euratom) No 1605/2002 (hereafter referred to as “the EU Financial Regulation”) states that: “Grants shall be subject to a work programme, to be published prior to its implementation.”

The following activities are scheduled to take place during 2018 in relation with Calls for proposals mentioned earlier in this document:

- The management of grant agreements, monitoring project implementation and execution of payments in accordance with the financial circuit for the grant agreements where reporting periods become due and/or projects close their work and final payment is due:
  - The ER1, ER2 and ER3 Calls,
  - The Wave 1 Call for IR and VLD,
  - The 2016 VLD Open Call,
  - The 2017 Geofencing Call;
- The second grant budget amendment campaign for IR and VLD Wave 1 projects (see below paragraph 2.6.1.1),
- The publication and opening of the U-space demonstration Call under the Connecting Europe Facility fund (see below paragraph 2.6.1.2),
- The planning and preparation of 3 new Calls for proposals to be published in 2019:
  - The Call for Wave 2 for IR and VLD: drafting of technical specifications and of call information material, planning of the evaluation;
  - The ER4 Call: drafting of technical specifications and of call information material;
  - The VLD Open 2 Call: drafting of technical specifications and of call information material.

#### 2.6.1.1 Grants Management within H2020 set of rules: SJU Grant Budget Amendment procedure for Wave 1 IR and VLD Call

Calls under the H2020 programme are regulated by Regulation (EU) No 1290/2013.

The procedure described in the SJU Annual Work Programme 2016 will be complemented by the grants budget amendment procedure for adjustment of maximum grant budget amount and associated EU contribution<sup>44</sup>.

Since the first IR/VLD Call for proposals (Wave 1) had a total awarded value of EUR 246,518 million and the available funding for grants awarded before 2017 was limited to EUR 50 million (+EUR 1,47

<sup>44</sup> SJU Annual Work Programme 2016 Amendment n.1, pages 35-36.

million EFTA contributions), a grant amendment procedure was introduced in the Amendment number 1 of the Annual Work Programme 2015, adopted by the Administrative Board on the 23/10/2015. This procedure is further detailed in the Annual Work Programme 2016 and is now fully documented in an SJU document entitled “Specific Amendment Procedure based on Budgetary Grounds - SESAR 2020 IR/VLD Wave 1”, dated December 2016. This documented procedure will be used in order to revise all complementary grants of Call H2020-SESAR-2015-2 (Wave 1 IR/VLD); applicable from 2017 onwards and until the full funding of the grants are committed.

For the three H2020 Calls to be launched in 2019, the SJU will comply with all provisions of H2020 Work Programme 2018-2020<sup>45</sup>. However, it should be noted that the SESAR 2020 programme will deliver results collectively through the SESAR Solutions, and not project by project. Therefore, it is not necessary for all IR projects and VLD activities (under Calls with reference H2020-IBA-SESAR-2019-1 and H2020-SESAR-2019-3) to provide open access for all data, and these projects and activities will opt out of the provisions of Annex L. ‘Conditions related to open access to research data’ in the General Annexes to the H2020 Work Programme 2018-2020. This opt-out also aims to protect results that are expected to be commercially or industrially exploited.

### **2.6.1.2 Management of Calls and Grants not falling within H2020 set of rules: the CEF-SESAR-2018-1 U-space Call**

As indicated in the previous paragraph, one Open Call for demonstration activities will be issued in early 2018. The overall objective of the proposed Call is to comprehensively prepare and de-risk a rapid deployment of U-space initial services (U2) as outlined in the U-space Blueprint. U2 provides the initial set of key services building on the foundation services (U1) by adding game-changing improvements enabling initial beyond visual line-of-sight operations (BVLOS) in rural and urban environments and facilitating the processes for authorisations for some drone operations.

This Call shall enable the award of grants to establish 5 demonstration sites across 5 EU Member States for the above mentioned initial U-space services, each site supporting one or more U-space operator configurations and demonstrations and including coordination across sites to enable harmonised and standardised full-scale deployment of U2 services at EU level.

#### **2.6.1.2.1 Call identifier**

This open VLD Call (CEF-SESAR-2018-1) is funded through Commission CEF funds in accordance with the Commission Implementing Decision C(2017) 5437. It follows a mandate given by the Commission to the SJU under delegation agreement ref. MOVE/E3/DA/2017-564/si2.771010 signed on 13/12/2016.

The SESAR JU will liaise with INEA<sup>46</sup> to share their experience in managing CEF Calls and contracts and will also assess the feasibility of using existing tools for call publication, evaluation & grant preparation.

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<sup>45</sup> The H2020 Work Programme 2018-2020 was adopted on 27 October 2017 and published on the Participant Portal (European Commission Decision C(2017)7124 of 27 October 2017)

<sup>46</sup> INEA is the European Innovation and Networks Executive Agency

### 2.6.1.2.2 Indicative Call timetable

Publication date	January 2018
Opening date	January 2018
Final date for submission	May 2018
Information on the outcome of the evaluation	Maximum 5 months from the final date for submission <sup>47</sup>
Signing of grant agreements	August - November 2018

**Table 23: Indicative timetable for U-space Call with reference CEF-SESAR-2018-1**

### 2.6.1.2.3 Indicative Call budget

The indicative budget for this Call is EUR 9 500 000.

Budget 2018	Commitment	Payment
B03733 – U-space Demo	In 2018: EUR 9.500.000	In 2018: EUR 2.000.000 In 2019: EUR 4.500.000 In 2020: EUR 3.000.000

**Table 24: Indicative budget for U-space Call with reference CEF-SESAR-2018-1**

### 2.6.1.2.4 Activities covered by this Call

This Call will support pilot activities (in accordance with Article 2(6) of the CEF Regulation) to establish U-space demonstration platforms each performing fast-track to innovation activities that will:

- develop, improve or adapt a new technology or an innovative solution and implement it in order to test its feasibility and suitability as well as its added value before deploying it on a larger scale; and/or
- deploy an existing technology, infrastructure or service (i.e. already in use elsewhere but new to a particular sector, system or geographical area) in order to gain experience and/or create market conditions for deployment on a larger scale.

The activities within a project proposal may include the deployment of required infrastructure or technology on a limited scale relevant to the objective of testing, demonstrating and validating the viability of the proposal. Pilot activities of such a study should be of an experimental nature and designed to test the feasibility from demonstration stage towards market uptake, including activities such as live trials, test-beds, systems validation in real-world working conditions, demonstration of U-space service delivery models, and standard setting. Alternatively a project or sub-project (work package) can propose to use and share an existing demonstration platform for the purpose of this

<sup>47</sup> SJU will make the utmost effort in order to inform applicants by end of July 2017



Call, the proposal must describe how availability, access, information sharing etc. will be addressed to secure the proposed outcome and results.

The coordinating applicant (Member State or a legal entity supported by a Member State) shall include adequate coordination with EASA to implement the proposed demonstration activities. The demonstrations conducted within this framework are expected to bring required safety evidence on the operation and technical impact of U2 services to ease wide scale roll-out. The demonstrations will build on the foundation services to be deployed as U1 services by 2019. They shall prepare operational deployment of U2 services by providing recommendations on standards, regulatory needs, and when relevant performance requirements supporting the risk based approach adopted for drone operations.

In accordance with the need for an interoperable, harmonised and standardised deployment of U2 services across Europe, beneficiaries of the U-Space Call for Proposal shall commit to cooperate, under coordination of the SJU, with the beneficiaries of other related initiatives awarded by the SJU. For this purpose and for the full duration of the SESAR Development Phase, the beneficiaries of the U-Space Call for Proposal shall provide access to the results of the projects to SJU beneficiaries of other related initiatives under fair and reasonable conditions to contribute to and support the parallel prototype regulatory process for drones placed under the aegis of EASA.

The full list of targeted U2 services will be provided in the technical specifications at the time of the call publication/opening.

For each project proposal specific requirements must be identified to secure a strong engagement with relevant authorities. For BVLOS Urban, projects will be encouraged to demonstrate evidence of synergies with “Smart Cities” initiatives or between at least two of the sectors covered by the Connecting European Facility Regulation.

Projects are encouraged to be interdisciplinary, cutting across different sectors and technologies. Projects supporting innovative concepts that have the potential to disrupt or to create new markets are particularly welcome such as the possibility for multiple U-space service providers to deliver services in the same geographical environment with either shared or interoperable infrastructure.

The time to initial market take-up should be no more than 3 years from the start of each project. In very well-justified cases linked to the specific characteristics of a particular application, the time to initial market take-up could be longer.

Possible impacts on data protection, privacy and security, in particular, or on other cross-cutting EU policy objectives, must be highlighted.

Participation from industry is strongly encouraged, as well as actors with an important role in commercialisation and operation, such as end-users, incubators, investors, and the public sector. The inclusion of start-ups and SMEs with ground-breaking ideas that could create new markets is also strongly encouraged.

#### **2.6.1.2.5 Expected results**

The U-space demonstrations will provide the basis for initiating a wide scale roll-out of U2 services in Europe in a safe and harmonized fashion.

The results will:

- Boost EU collaboration and generate confidence from investors, innovators and regulators.



- Significantly reduce the business risks for key U-space investors.
- Put the EU at the forefront of global standards setting in the domain.
- Raise awareness regarding SESAR activities related to U-space and show tangible progress on technology and services.
- Have been achieved by supporting U-space pioneers all the way to pre-deployment.
- Confirm the full-scale deployment readiness at EU level.
- Significantly contribute to the EU regulatory process for drones placed under the aegis of EASA, which will enable the interoperable, harmonised and standardised deployment of U2 services across Europe.

#### **2.6.1.2.6 Duration and key milestones**

The awarded projects shall deliver full demonstration activities by August 2019 and will conclude all remaining activities by no later than end of February 2020.

#### **2.6.1.2.7 Funding rate, number of contracts and location**

In order to ensure efficiency and the expected outcome results, applicants are encouraged to submit applications for actions with a total requested EU contribution of no less than EUR 1 000 000 per project. The maximum EU contribution per project is EUR 2 000 000 (maximum funding rate 50%) to enable the establishment of between 5 and 10 projects.

The SJU aims to award between 5-10 projects across 5 sites located in 5 Member States; demonstrating urban services, possibly connecting to sub-urban services and where these services may be delivered by more than one service provider in order to demonstrate interoperability and standards development.

#### **2.6.1.2.8 Eligibility criteria**

##### ***Eligible entities / eligible applicants***

In accordance with Article 9 of the CEF Regulation, proposals shall be eligible if submitted by one or more Member State or, with the agreement of the Member State(s) concerned, by public or private undertakings or bodies established in Member States.

Proposals may be submitted by entities which do not have legal personality under the applicable national law, provided that their representatives have the capacity to assume legal obligations on their behalf and offer a guarantee for the protection of the Union's financial interest's equivalent to that offered by legal persons.

Proposals submitted by natural persons shall not be eligible.

Only where necessary in order to achieve the objectives of a given project of common interest and where their participation is duly justified, third countries and entities established in third countries may participate in actions contributing to projects of common interest. They may not receive financial assistance except where it is indispensable to the achievement of the objectives of a given project of common interest.

Proposals with any entity which are in any of the following situations shall be either excluded or prevented from being awarded a grant:

- Entities in bankruptcy or being wound up, are having their affairs administered by the courts, have entered into an arrangement with creditors, have suspended business activities, are the

subject of proceedings concerning those matters, or are in any analogous situation arising from a similar procedure provided for in national legislation or regulations;

- Entities or persons having powers of representation, decision-making or control over them have been convicted of an offence concerning their professional conduct by a judgment of a competent authority of a Member State which has the force of *res judicata*;
- Entities or persons having powers of representation, decision-making or control over them have been the subject of a judgment which has the force of *res judicata* for fraud, corruption, involvement in a criminal organisation, money laundering or any other illegal activity, where such illegal activity is detrimental to the Union's financial interests;
- Subject to a conflict of interests;
- Guilty of misrepresenting the information required as a condition of participation in the grant award procedure or fail to supply that information.

### ***Eligible type of action***

A proposal must address Studies, within the meaning of Article 2 (6) of the CEF regulation. Proposals shall include activities that serve to develop, improve or adapt a new technology or innovative solution and implement it in order to test its feasibility and sustainability as well as its added value before deploying it on a larger scale.

These Studies may include pilot activities that will serve at least one of the following objectives:

- to develop, improve or adapt a new technology or an innovative solution and implement it in order to test its feasibility and suitability as well as its added value before deploying it on a larger scale;
- to deploy an existing technology, infrastructure or service (i.e. already in use elsewhere but new to a particular sector, system or geographical area) in order to gain experience and/or create market conditions for deployment on a larger scale.

### ***Eligibility of costs***

A grant may be awarded for an action which has already begun provided that the applicant can demonstrate the need for starting the action prior to the signature of the grant agreement. In accordance with Article 130(1) of the Financial Regulation, costs incurred prior to the date of submission of the grant application shall not be eligible for financing, meaning that costs incurred from the date of submission of the grant application may be considered eligible for funding by the SJU.

Grants will not be awarded retroactively for actions already completed.

#### **2.6.1.2.9 Selection criteria**

The applicant(s) must have access to solid and adequate funding sources, so as to be able to maintain activities for the period of the project funded and to co-finance the project. The applicant(s) must have the professional skills and qualifications required to complete the proposed Actions.

The verification of the financial and operational capacity does not apply to applicants which are Member State, a third country, a public sector body established in a Member State i.e. regional or local authority, a body governed by public law.

### ***Financial capacity***

The applicant(s) must have the financial capacity to complete the Action for which the grant is sought.

### **Operational capacity**

The applicant(s) must have and demonstrate in their respective proposals the operational and technical capacity to complete the project for which the grant is sought and must provide appropriate documents attesting to that capacity (e.g. description of the profile of the persons primarily responsible for managing and implementing the operation, organisation's activity reports, and proof of experience in carrying out projects of the same kind).

#### **2.6.1.2.10 Award criteria**

The methodology used will support the objective to award projects across a maximum of 5 sites located in 5 different EU member states. In support of this objective four award criteria, with their scope descriptions and respective sub-criteria are described below:

#### **CRITERION 1 - RELEVANCE**

Scope includes contribution to the Action through alignment of the proposal with the call description (both from this document and the call specifications to be made available at call publication & call opening) as well as the contribution to EU added value & CEF priorities. The following sub-criteria will be applied according to the scope & context of the proposal:

1. **Alignment of proposal objectives and material with the call specifications.** The proposal describes in a clear and pertinent manner how it proposes to address the call specifications defined.
2. **Contribution to EU added value.** The proposal is sufficiently ambitious and credible to add substantial value to Europe if deployed at a wide scale and also has the potential to move to market take-up (B2B or B2C) within 36 months.
3. **Relevance to CEF priorities.** The proposal shall provide evidence of synergies between at least two of the sectors covered by Connecting European Facility Regulation and/or other Union Programmes, notably "Smart Cities".

#### **CRITERION 2 - MATURITY**

Scope includes an assessment of whether the proposed Action is ready to demonstrate by September 2018 and be fully implemented and ready to go within 18 months.

1. **Credible, realistic and optimal roll-out of U2.** The proposed activities to be executed will contribute to a credible, realistic and optimal roll-out of U2 to the level of market uptake.
2. **Potential to bring important progress.** The underlying architecture is sound and has the potential to bring important progress to an existing state, industrial sector, business practice and/or societal challenge if deployed.
3. **The intrinsic quality of the proposal shows readiness to bring U-space services to a significantly higher level than current state-of-the-art.** The proposal demonstrates that, in terms of value for money, problems solved, new applications, sustainability, etc. there is significant potential to deliver the required demonstrations by September 2019 and complete the scope of work, meeting the requirements of the call specifications within 18 months.

#### **CRITERION 3 - IMPACT**

Scope of this award criterion covers the expected effect of the EU contribution on the financial viability and the extent to which the outputs of the project should contribute at the European and/or International level. The following sub-criteria will be used in the evaluation:

1. **The proposal could reasonably lead to implementation of U-space services in Europe.** In addition the result can be enhancing the innovation capacity of the consortium partners.
2. **Strengthens / accelerates the implementation of U-space.** The approach to demonstrating, involving key players and describing a clear path to implementation is well documented.
3. **Contributes to regulation, standards and market opportunity.** The market size, prospects for growth, and intended positioning of the solution shall be well documented, taking account of the needs for regulation and standards, and leading towards a positive opportunity for market launch within 36 months (unless specifically justified otherwise).
4. **Plan includes effective measures to exploit and disseminate the project results.** The project plan (including with respect to IPR management) addresses blocking factors and mitigations towards new business opportunities and means of capitalising on this with stakeholder buy-in to the approach.
5. **Involvement of key stakeholders that can help with market introduction.** A convincing strategy is provided to get key stakeholders on board, including EASA.
6. **Generation of a positive impact at the European level.** The proposed innovation is expected to deliver impacts other than economic (societal, environmental, scientific, etc.), in particular safety, privacy and security aspects are to be addressed.

#### CRITERION 4 - QUALITY

Scope of this award criterion covers the quality & efficiency of the proposed implementation in terms of soundness, coherence, capacity to deliver, management & control, quality & risk, communications approach and completeness & clarity of the information provided. In particular the following sub-criteria will be used in the evaluation:

1. **The work plan is coherent, effective & realistic.** Taking into account the project's ambition and objectives, includes a realistic and relevant time-frame, and refers to a sound and comprehensive implementation plan, in particular in relation to major deliverables. Tasks and resources are allocated in an appropriate and cost-effective way.
2. **The partners are able to deliver and continue towards a fast, wide market uptake.** Together the partners have what it takes (personnel, facilities, skills, networks, access to markets...). All implementation risks and threats are well identified; the proposal contains a risk mitigation plan, with detailed actions.
3. **The organisational framework & governance structure are established in a clear and efficient way.** Decision-making framework and strong engagement plan for relevant authorities including EASA is in place.
4. **There is a broad and adequate strategy for knowledge management and protection.** This strategy must be sufficient to ensure "freedom to operate" for all within the context of the Call and the proposed innovation/solution.
5. **The roll-out plan is realistic and convincing.** It is reasonable to presume that after concluding the work viable U-Space service and related applications could be in place within 36 months.

The weightings and thresholds for scoring are summarised in the following table:

Criteria	Relevance	Maturity	Impact	Quality
Weight (%)	20	20	30	30
Threshold per criterion (n/5)	3	3	3	3
Overall pass threshold (n/100)	70			

**Table 25: Weighting and thresholds per award criterion for the Call CEF-SESAR-218-1**

The scoring scheme used in evaluation for each criterion will be on a scale ranging from 0-5 with half points being valid; therefore, scores above 0 will be on a 10 point scale. Pass thresholds per criterion and overall are established in the table above.

### 2.6.2 Financial Management

The SJU will continue developing its internal financial processes and procedures, continuing its proactive approach to ensure the transparent and effective management of financial resources. During the course of 2018, the SJU will continue to aim for a high level of budget implementation (both in terms of commitments and payments), to continue to streamline workflows within the SJU's Finance related IT systems (ABAC/SAP) and with regards to the Horizon 2020 IT tools (SYGMA/COMPASS), to maintain a high level of accuracy in budgetary forecasting.

The SJU will also continue its services so that reimbursements to external experts, participants to governance bodies and candidates are carried out in accordance with the financial rules and the relevant contractual obligations.

By 2018, the provision of services that the SESAR Joint Undertaking have contracted to DG BUDGET will have reached full maturity. The procedures and tools at the SJU related to those services will be fully adapted to this new scenario. Those services are Treasury, Accounting, Central Budgetary Framework, Recovery Actions, Validation of Local Systems and Reporting.

### 2.6.3 Legal and Procurement Support to Operations

The Legal Affairs and Procurement area is responsible for providing legal and procurement expertise to the whole SJU with the aim to ensure/contribute to:

- the regularity and legality of all SJU's binding agreements, contracts and measures,
- the respect of the public and private partnership principles detailed in the SJU membership agreement in collaboration with the SJU Members,
- the regularity and legality of all grant and procurement procedures (as per SJU Financial Rules, DG BUDG recommendations and any applicable rule).

In this context, during 2018, Legal Affairs and Procurement area will continue providing transversally legal support to all SJU departments and sectors as well as to their processes. This legal support will be provided through:

- Providing (written) legal advice and opinions on the application and interpretation of the applicable rules and procedures, including on H2020, CEF and highly complex legal matters,
- Facilitating the decision-making processes of the SJU senior management by providing legal input and by ensuring proper follow-up,
- Providing legal risks assessments on request,
- Developing and providing training/information sessions to non-legal staff on legal matters,
- Establishing and maintaining good cooperation with the key stakeholders of the SJU (SJU Members, European Commission, EUROCONTROL, etc.) within the scope of the responsibilities assigned,
- Representing the SJU in and participating to the inter-agency legal and procurement networks (NAPO and IALN) and H2020 legal networks (LMIG and NoL),
- Contributing to ensure that the SJU complies with its transparency obligations and its obligations under the code of conduct, etc.

The Legal Affairs and Procurement area activities contribute to efficient, timely, accurate and robust management of SJU functioning including administrative and operational activities.

Regarding the procurement support to be provided over 2018, the Procurement Plan for 2018 is described within Annex IX.

#### **2.6.4 Corporate Planning and Reporting activities**

By the end of 2018, the SJU will prepare and submit to the Administrative Board its Single Programming Document for 2020, covering the period 2020-2022. The submission of this document to the EC will be prepared for 31st January 2019.

In addition, the SJU will also prepare and submit its Consolidated Annual Activity Report for 2017, which will be ready for submission to the Budgetary Authorities by the 30th June 2018.

#### **2.6.5 Corporate Quality Management**

In 2018, the SJU will maintain its Quality Management System and monitor quality. Specific continuous improvement actions will be defined and followed up within the QICT Committee.

The SJU will also run its Information & Document Management System. As this I/DMS is deployed in 2017, improvement actions will be planned and undertaken, and will be followed up by the QICT Committee.

In 2018, the SJU should also deploy its renewed Corporate Performance Monitoring System (the design and first phase of implementation of which is planned in 2017).

#### **2.6.6 Human Resources**

In 2018 the HR function of the JU will also seek to further raise staff competence and capability, assisting the delivery of organisation-wide productivity improvements through the application and administration of a range of enablers such as effective training, staff development and transparent and fair staff appraisal and promotion exercises.

The SJU will further strengthen its culture of excellence at all levels by providing targeted technical and other relevant training and development programmes for staff to develop a high-performing organisation. Assisting staff in identifying their training needs and supporting learning to allow access to appropriate generic and technical training courses and material will also remain a priority.

SJU will also continue to develop leading practices in the recruitment, retention and recognition of staff with the emphasis in 2018 on improving staff retention and development through the introduction of a number of targeted initiatives designed to reduce potentially high turnover rates, such as conducting a staff survey, organising team-building activities and performing 360° degrees exercises in order to identify key areas of improvement in the way teams collaborate and communicate. Similar initiatives in previous years have helped keeping a high occupancy rate (100% at the end of 2016) and a low staff turnover rate of 9% at the end of 2016.

The main objectives of HR are to ensure that the SJU's Staff Establishment Plan is filled, ensure the efficient management of staff resources and an optimal working environment. HR activities will focus on the following during 2018:

- 42 positions to be filled throughout 2018 (39 TAs and 3 SNEs);

- In conjunction with the Commission, the Administrative Board will continue to adopt the relevant Implementing Rules relating to HR policy where appropriate (middle management, learning & development, etc.);
- Follow-up of the Service Level Agreement with DG HR and DIGIT regarding the implementation of the “Sysper for Agencies” software (HR information management system).

### 2.6.7 Facilities Management, ICT and Logistics

Facilities Management, ICT and Logistics are related to the following administrative routine and services:

- ICT Coordination, supporting the corporate governance by providing expert advice and input in the fields ICT & Unified Communications;
- Missions Coordination, supporting SJU staff by providing core support for their travel bookings and execution of missions, as well as to the reimbursement of the travel expenses towards the travel agency’s expenses and the traveller’ claims;
- Facilities management Coordination, supporting Intra-muros staff by providing facility coordination support in the Buildings and Logistics services;
- Insurance Coordination.

During the reporting period, a continuous care will be granted to ensure that the IT infrastructure implemented and operating environment are suitable to meet the needs and budget of SESAR 2020, deviations could result or in Change Requests or in Transformation projects.

Service level measurement and performance improvement activities will be safeguarded by Service Improvement Requests & Problem Management.

Ensuring continuity and interoperability of ICT service provided will require particular attention when renewing contracting elements of the infrastructure environment, of the centralised licencing portfolio, as well of for the ICT Coordination & Validation sourcing Services.

The execution of the SJU Governance and the Business Continuity activities will be assured by studies services such as advice, benchmarking and high-level consultancy.

It is also important to note that the ICT Coordination services contract will expire at the end of 2018. Contractual arrangement will have to be prepared and signed for the continuity of the services.

Missions support will also continue during 2018, with the corporate support area providing overall mission process management and support to all staff across the SJU while transitioning to new Mission system over the period if necessary.

In 2018, in terms of Facilities management, work will continue on a number of initiatives in SJU’s premises in Brussels to improve the productivity, safety & efficiency of the working environment and facilities offered to SJU staff. The key initiatives are the Audit of the premises, the addition of facilities services such as handy man for maintenance and renovations, and the Implementation of solutions to prevention and protection audit recommendations. Some minor works for the maintenance and improvement of facility are still to be accomplished. Furthermore, in 2018 a Call for tender will be launched with 3 lots for the cleaning services, facility for maintenance and renovation and the replacement of the carpet.



2018 will also see the renewal of SJU's insurance contracts with coherence and respect of coverage with the support of advisory service/expertise for Insurance matters. The area will also provide support and coordination in recovering any incident covered by SJU's insurance policies.

## 2.6.8 Internal Control and Audits

### 2.6.8.1 Financial Procedures

In 2018 the SJU will continue to ensure the robustness and appropriateness of its financial circuits. This will involve the continuous improvement of checklists, delegations of authority and backup systems in order to provide clarity and consistency between financial procedures. Special emphasis will be placed on continuing to integrate the relevant provisions and workflows stemming from Horizon 2020 rules and tools into the existing SJU financial environment and set-up.

### 2.6.8.2 Ex-ante & Ex-post controls

#### Ex-ante controls

Ex-ante controls remain an important tool for the SJU to prevent errors and avoid the need for ex-post corrective actions. In accordance with Article 66 of the Financial Regulation and Article 44 of the SJU's Financial Rules "each operation shall be subject at least to an ex ante control based on a desk review of documents and on the available results of controls already carried out relating to the operational and financial aspects of the operation". The main objective of ex-ante controls therefore is to ensure that the principle of sound financial management is applied. In 2018 the following ex-ante activities will take place:

- Generate and check grant agreements;
- Initiate, check and verify invoices for administrative expenditure;
- Assessment of periodic reports from grants and the verification and payment of cost claims.

#### Ex-post controls

One of the other major pillars of assurance for SJU is its ex-post audit activity and as such it represents a significant element of the Internal Control System. Its main objectives are to:

- Assess the regularity and legality of the transactions, including the direct financial contribution;
- Determine the sound financial management of the transactions, with the support of the internal or external technical experts, with the overall objective to assess the value for money of the SJU operations;
- Identify systemic errors through the analysis and synthesis of the results obtained and to formulate recommendations to address the issues;
- Provide the SJU auditees with recommendations in order to improve the financial management, processes, procedures and practices applied to the activities related to the SJU contracts;
- Provide where necessary, a sound basis for the recovery of funds.

In 2018 the audit activity will be split in two focal points: a) The second year of the SESAR 2020 Programme and b) any remaining audits cost claims under SESAR 1 (adjustments to previous cost claims, risk-based, etc.).



For the former, the H2020 Audit Strategy will apply. The SJU's payment of costs will be included in the population of the Common Representative Sample that will be drawn by the Common Audit Service of the EC. This activity will be complemented by "additional sample" and "Article 10 sample" established to provide timely results in order to enable the SJU to draw the conclusions and report also on its specific error rates.

For the latter, the audit activities will be performed on the basis of the ex-post audit strategy, as revised by the SJU Administrative Board in October 2015 ((ADB(D)-12-2015)). The precise number of audits to be performed will depend on risk criteria.

### 2.6.8.3 Audits

#### Internal Audit Capability

The IAC will perform audit and consulting engagements based on risks identified in 2017, with special focus on the recommendations from the final evaluation of SESAR 1 and the interim evaluation of SESAR 2020 conducted by the EC in 2017, and will coordinate activities of the IAS and ECA as described below.

#### Internal Audit Service (IAS) 2018 Audits

Internal audits are carried out by Internal Audit Service of the European Commission (IAS) in liaison with the SJU's Internal Audit Capability (IAC). It is expected that a strategic risk assessment will be performed by the Internal Audit Service of the European Commission (IAS) in 2018. The outcome of this overall assessment of risks will lead to a list of potential audit topics to cover the period 2018-2020.

#### European Court of Auditors (ECA) 2018 Audits

At this stage, the SJU is not aware of the external audits to be conducted by the ECA in 2018, with the exception of the recurring Annual Audit of the accounts for the financial year 2017.

### 2.6.9 Data Protection

The SJU data protection officer will continue to ensure and apply the data protection legal framework within the Joint Undertaking, as stated in Regulation 45/2001 and the EDPS' "Position Paper on the role of Data Protection Officers in ensuring effective compliance with Regulation (EC) 45/2001"/. As from 25 May of 2018, the function will evolve into providing advice to the Controller and monitor compliance with the legal framework, as stated in the General Data Protection Regulation 2016/679<sup>48</sup>.

Special priority will be given to ensure adherence to the future Regulation that will replace Regulation 45/2001<sup>49</sup>. For this purpose, the SJU data protection officer has prepared an Action Plan

<sup>48</sup> Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation, "GDPR")

<sup>49</sup> Proposal for Regulation of the European Parliament and of the Council on the protection of individuals with regard to the processing of personal data by the Union institutions, bodies, offices and agencies and on the free movement of such data, and repealing Regulation (EC) No 45/2001 and Decision No 1247/2002/EC

with a view to ensure a smooth transition towards the new requirements. In particular the SJU DPO will undertake the following activities:

- Finalise the last notifications and maintain a system of records of processing operations. Ensure that new data subject rights are reflected in privacy statements.
- Develop specific SJU procedures of impact assessment and data breaches.
- Plan, provide advice and report to Controller on accountability at three levels.
- Follow up on the new or updated guidance to be issued by the European Data Protection Supervisor.

### 2.6.10 Indicators and measurements applicable for the Strategic Area of Operation 6

The SJU has the following objectives to be delivered during 2018 which are outlined in the table below and which will be tracked according to the following indicators:

2018 Objectives	Indicators	Target 2018
<b>Implement the Calls and grants management framework</b>	Publish the Calls as per the 2015-2021 Calls sequence (see section II figure 6)	
<b>Implement findings of EC's mid-term review of H2020 implementation</b>	Full implementation of all interim review findings from H2020 interim review	100% of H2020 interim review findings / recommendations initiated in 2018
<b>Ensure full compliance with programming and reporting requirements (H2020, EC, national...)</b>	Relevant data kept up-to-date and of relevant quality to achieve full compliance in SJU with relevant programming and reporting obligations  Timely delivery of programming and reporting documents	Full compliance with programming and reporting obligations for JUs <ul style="list-style-type: none"> <li>• SPD 2019-2021 submitted to ADB for adoption by December 2018 latest with all required content</li> <li>• Draft SPD 2020-2022 submitted to the ADB for initial review by December 2018</li> <li>• CAAR 2017 adopted by the ADB and sent to Authority by 30/06/2018 latest</li> </ul> No critical observation from auditors
<b>Monitor efficiency and effectiveness of SJU's corporate, financial, HR &amp; programme reporting &amp; management information</b>	Discrepancies against processes, and their translation in QMS improvement actions  Continuous registration of improvement actions as part of the SJU QMS  Acceptable level of corporate risks as per risk management plan, and allow for leveraging of opportunities	All process improvement actions are taken in due course  All risk related actions implemented in due course  Full compliance with Internal Control Standards by the end of 2018 (to be documented in the CAAR 2018)

2018 Objectives	Indicators	Target 2018
	Effective staffing management	Maximum turnover rate: 10% Minimum occupancy rate: 90%
<b>Balancing payments to Members and beneficiaries</b>	Percentage of SESAR 2020 balancing payments executed timely	100% of requested payments made
	Budget execution: the commitment appropriations and payment appropriations are executed as planned in the 2018 Budget	90% for commitment appropriations 70% for payment appropriations
<b>Deliver infrastructure services to enable teams and the SJU to operate smoothly</b>	Corporate Information & Document Management policy fully deployed Quality of IT, infrastructure and facilities and existence of Business Continuity and Disaster Recovery planning	No major disruption of service unless triggered under business continuity & disaster planning

**Table 26: Objectives, indicators and 2018 targets for financial, administrative and corporate management**

### 3 Budget & Resource Information 2018

EU contribution for 2018 is subject to the adoption of the DB 2018 by the budgetary authority.

#### 3.1 Budgetary Information 2018

##### Title I – Salaries

The total amount foreseen for Title I in the 2018 budget is EUR 6,04 million. In 2018, Title I expenditure will be exclusively funded by the SESAR 2020 programme. A detailed breakdown by budget line for Title I items is included in Annex II (Financial Resources).

A decrease of 2 CAs positions in the course of 2018 compared to 2017 is foreseen (see paragraph 3.2 below), and a slight reduction in mission costs is foreseen. Consequently, the costs in Title I are slightly decreased compared to 2017.

Any costs for increase of salaries, reclassifications and contract changes are sufficiently covered by the requested budget.

##### Title II – Administrative expenses

The total amount foreseen for Title II in the 2018 budget is EUR 3,5 million. All Title II budget lines are kept at the same level of 2017. In 2018, Title II expenditure will be exclusively funded by the SESAR 2020 programme. A detailed breakdown by budget line for Title II items is included in Annex II (Financial Resources).

##### Title III – Operational expenses

The total amount foreseen for Title III in the 2018 budget is EUR 140,4 million (new commitment appropriations). This title includes operational activities directly conducted by the SJU (“Studies/developments conducted by the SJU”, i.e. non-Members related operations) and those conducted by its Members (“Studies/developments conducted by the Members”, i.e. Members related operations). A detailed breakdown by budget line for Title III items is included in Annex II (Financial Resources).

The amount of operational expenditures includes unused appropriations from the 2017 budget.

It is expected that all SESAR 1 related activities will be fully completed in 2018 and that no new commitments will be done in relation with SESAR 1.

#### 3.2 Staff Establishment 2018

The SJU Staff Establishment Plan constitutes a document adopted by the Administrative Board defining the total number of positions by grade necessary to ensure the sound operational and financial management of the organization and in order to execute its Work programme.

The number of staff requested for 2018 is in line with the level of staff requested in the new Multi-Annual Staff Policy Plan (MSPP) 2018-2020 through the Single Programming Document. A more detailed breakdown of the staff establishment can be found in Annex III (Human Resources).

In 2018, the staff establishment plan includes in total 39 Temporary Agent positions filled by personnel recruited under the following types of contracts: TAs contracts for positions requesting long-term duration contracts, and CAs contracts for some administrative support functions.

In addition, the Administrative Board authorized 3 SNEs positions where Member States' experience is requested. This expertise from the Member States air transport administrations will remain across the period 2018-2020 in the area of Master Planning, Regulatory Affairs and ATM.

Following the decision of the Administrative of 31 May 2017, secondments of personnel of the SJU Members to the Joint Undertaking are considered as additional contribution from the Members in the meaning of Article 10.4 of the Membership Agreement.

## Annexes

### Annex I: Resource Allocation (Budget and Total HR) per Area of Operation

#### Budget Allocation (Million EUR)

The table below provides information related to Titles I, II and III financial contributions broken down per Strategic Area of Operation, in accordance with the outline presented in section II chapter 3 and section III chapter 3.

Note: for 2019 and 2020, the figures provided are estimates.

Multi-Annual Strategic Area of Operation	COMMITMENT Appropriations		PAYMENT Appropriations	
	M€	%	M€	%
<b>2018</b>				
Multi-Annual Strategic Area of Operation 1: Provide Strategic Steering to the SESAR Programme	7,44	5%	8,36	6%
Multi-Annual Strategic Area of Operation 2: Deliver Exploratory Research	2,02	1%	17,29	12%
Multi-Annual Strategic Area of Operation 3: Deliver Industrial Research and Validation	102,16	67%	92,45	62%
Multi-Annual Strategic Area of Operation 4: Deliver Very Large Scale Demonstrations	37,84	25%	26,11	17%
Multi-Annual Strategic Area of Operation 5: Deliver SESAR Outreach	1,95	1%	3,62	2%
Multi-Annual Strategic Area of Operation 6: Deliver effective financial, administrative and corporate management	2,04	1%	2,04	1%
<b>TOTAL 2018</b>	<b>153,44</b>	<b>100%</b>	<b>149,88</b>	<b>100%</b>
<b>2019</b>				
Multi-Annual Strategic Area of Operation 1: Provide Strategic Steering to the SESAR Programme	3,04	3%	5,71	5%
Multi-Annual Strategic Area of Operation 2: Deliver Exploratory Research	41,97	35%	18,39	15%
Multi-Annual Strategic Area of Operation 3: Deliver Industrial Research and Validation	38,85	33%	63,50	53%
Multi-Annual Strategic Area of Operation 4: Deliver Very Large Scale Demonstrations	28,93	24%	27,53	23%
Multi-Annual Strategic Area of Operation 5: Deliver SESAR Outreach	3,19	3%	2,74	2%
Multi-Annual Strategic Area of Operation 6: Deliver effective financial, administrative and corporate management	2,07	2%	2,07	2%
<b>TOTAL 2019</b>	<b>118,0</b>	<b>100%</b>	<b>119,9</b>	<b>100%</b>

2020				
Multi-Annual Strategic Area of Operation 1: Provide Strategic Steering to the SESAR Programme	1,16	1%	3,45	3%
Multi-Annual Strategic Area of Operation 2: Deliver Exploratory Research	0,98	1%	9,65	10%
Multi-Annual Strategic Area of Operation 3: Deliver Industrial Research and Validation	90,21	80%	59,59	61%
Multi-Annual Strategic Area of Operation 4: Deliver Very Large Scale Demonstrations	16,50	15%	20,58	21%
Multi-Annual Strategic Area of Operation 5: Deliver SESAR Outreach	0,97	1%	2,72	3%
Multi-Annual Strategic Area of Operation 6: Deliver effective financial, administrative and corporate management	2,05	2%	2,05	2%
<b>TOTAL 2020</b>	<b>111,9</b>	<b>100%</b>	<b>98,1</b>	<b>100%</b>

**Table 27: Financial resource allocation per Strategic Area of Operation per year in the period 2018-2020**

## Human Resources

Multi-Annual Strategic Area of Operation	Total HR	%
<b>2018</b>		
1. Provide Strategic Steering to the SESAR Programme	5	12%
2. Deliver Exploratory Research	4	9%
3. Deliver Industrial Research and Validation	15	37%
4. Deliver Very Large Scale Demonstrations	5	12%
5. Deliver SESAR Outreach	4	9%
6. Deliver effective financial, administrative and corporate management	9	21%
<b>TOTAL 2018</b>	<b>42</b>	<b>100%</b>
<b>Estimate 2019</b>		
1. Provide Strategic Steering to the SESAR Programme	5	12%
2. Deliver Exploratory Research	4	9%
3. Deliver Industrial Research and Validation	15	37%
4. Deliver Very Large Scale Demonstrations	5	12%
5. Deliver SESAR Outreach	4	9%
6. Deliver effective financial, administrative and corporate management	9	21%
<b>TOTAL:</b>	<b>42</b>	<b>100%</b>
<b>Estimate 2020</b>		
1. Provide Strategic Steering to the SESAR Programme	5	12%
2. Deliver Exploratory Research	4	9%
3. Deliver Industrial Research and Validation	15	37%
4. Deliver Very Large Scale Demonstrations	5	12%
5. Deliver SESAR Outreach	4	9%
6. Deliver effective financial, administrative and corporate management	9	21%
<b>TOTAL:</b>	<b>42</b>	<b>100%</b>

**Table 28: Human resource allocation per Strategic Area of Operation per year in the period 2018-2020**





## Annex II: Financial Resources (Tables) 2018 – 2020

In this annex, the financial resources are presented first with a whole SESAR JU view thus combining SESAR 1 and SESAR 2020 figures, then the information is given for SESAR 1 and for SESAR 2020 specifically.

### Table 1 – Expenditure

**SJU Expenditure Budget per Title in (year N) and (year N+1) – Commitment & Payment appropriations**

Expenditure (in €)	N (2017)		N+1 (2018)	
	Commitment appropriations	Payment appropriations	Commitment appropriations	Payment appropriations
<b>Title 1</b>	6.160.000	6.160.000	6.040.300	6.040.300
<b>Title 2</b>	4.180.351	4.180.351	3.476.234	3.476.234
<b>Title 3</b>	103.005.914	181.473.032	120.001.228	85.272.880
<b>Total expenditure</b>	<b>113.346.265</b>	<b>191.813.383</b>	<b>129.517.762</b>	<b>94.789.414</b>

**SJU Expenditure Budget per Title in (year N) and (year N+1) – Commitment & Payment appropriations**

Expenditure (in €)	N (2017)		N+1 (2018)	
	Commitment appropriations	Payment appropriations	Commitment appropriations	Payment appropriations
<b>Title 1</b>	6.160.000	6.160.000	6.040.300	6.040.300
<b>Title 2</b>	4.180.351	4.180.351	3.476.234	3.476.234
<b>Title 3</b>	103.005.914	181.473.032	143.921.427	131.392.685
<b>Total expenditure</b>	<b>113.346.265</b>	<b>191.813.383</b>	<b>153.437.961</b>	<b>140.909.219</b>

Table 29: SJU whole Expenditure Budget per Title in 2017 (year N) and 2018 (year N+1) – Commitment & Payment appropriations

**SJU Expenditure Budget per Title in (year N) and (year N+1) – Commitment & Payment appropriations**

Expenditure (in €)	N (2017)		N+1 (2018)	
	Commitment appropriations	Payment appropriations	Commitment appropriations	Payment appropriations
<b>Title 1</b>	165.000	165.000	-	-
<b>Title 2</b>	421.844	421.844	-	-
<b>Title 3</b>	1.367.416	100.327.549	-	-
<b>Total expenditure</b>	<b>1.954.260</b>	<b>100.914.393</b>	<b>-</b>	<b>-</b>

**SJU Expenditure Budget per Title in (year N) and (year N+1) – Commitment & Payment appropriations**

Expenditure (in €)	N (2017)		N+1 (2018)	
	Commitment appropriations	Payment appropriations	Commitment appropriations	Payment appropriations
<b>Title 1</b>	165.000	165.000	-	-
<b>Title 2</b>	421.844	421.844	-	-
<b>Title 3</b>	1.367.416	100.327.549	-	20.995.293
<b>Total expenditure</b>	<b>1.954.260</b>	<b>100.914.393</b>	<b>-</b>	<b>20.995.293</b>

Table 30: SESAR 1 Expenditure Budget per Title in 2017 (year N) and 2018 (year N+1) – Commitment &amp; Payment appropriations

**SJU Expenditure Budget per Title in (year N) and (year N+1) – Commitment & Payment appropriations**

Expenditure (in €)	N (2017)		N+1 (2018)	
	Commitment appropriations	Payment appropriations	Commitment appropriations	Payment appropriations
<b>Title 1</b>	5.995.000	5.995.000	6.040.300	6.040.300
<b>Title 2</b>	3.758.507	3.758.507	3.476.234	3.476.234
<b>Title 3</b>	101.638.498	81.145.482	120.001.228	85.272.880
<b>Total expenditure</b>	<b>111.392.005</b>	<b>90.898.989</b>	<b>129.517.762</b>	<b>94.789.414</b>


**SJU Expenditure Budget per Title in (year N) and (year N+1) – Commitment & Payment appropriations**

Expenditure (in €)	N (2017)		N+1 (2018)	
	Commitment appropriations	Payment appropriations	Commitment appropriations	Payment appropriations
<b>Title 1</b>	5.995.000	5.995.000	6.040.300	6.040.300
<b>Title 2</b>	3.758.507	3.758.507	3.476.234	3.476.234
<b>Title 3</b>	101.638.498	81.145.482	143.921.427	110.397.392
<b>Total expenditure</b>	<b>111.392.005</b>	<b>90.898.989</b>	<b>153.437.961</b>	<b>119.913.926</b>

**Table 31: SESAR 2020 Expenditure Budget per Title in 2017 (year N) and 2018 (year N+1) – Commitment & Payment appropriations**

In the table above, for 2018, Title 3 includes payment appropriations for:

- EUR 4 million related to the U-space Call (with reference CEF-SESAR-2018-1) a pre-financing for the activities undertaken as a result of the award decision on that Call,
- EUR 400 000 related to the Airspace Architecture study (see Procurement Plan in Annex IX);
- EUR 250 000 related to the Geofencing demonstration activities (in relation with the Call with reference SESAR-2017-1);
- For the remaining amount :
  - The ongoing activities under the H2020 Calls (H2020-SESAR-2015-1, H2020-SESAR-2015-2, H2020-SESAR-2016-2 and H2020-SESAR-2016-2),
  - Other operational expenditure related to services and activities acquired by the SJU through various contracts in the year 2018.

**IN-KIND EXPENDITURE**

<i>all figures in Euro</i>	<b>Commitment Appropriations</b>			
	<b>Budget 2017</b>	<b>Budget 2018</b>	<b>Budget 2019</b>	<b>Budget 2020</b>
<b><u>Title / Chapter</u></b>				
<b>1. Staff Expenditure</b>				
1.1. Staff Expenditure As Per Staff Establish. Plan				
1.2. Contract Agents, Interim Staff				
1.3. Secondments From Members				
1.4. Seconded National Experts				
1.5. Mission Costs				
1.6. Other Staff Expenditure				
<b>2. Administrative Expenditure</b>				
2.1. Rental Of Buildings And Associated Costs				
2.2. Movable Property And Associated Costs				
2.3. Pr And Events				
2.4. Postage And Telecommunications				
2.5. Administrative Board Expenditure				
2.6. Current Administrative Expenditure				
2.7. It Expenditure And Technical Facilities				
2.8. Administrative Support Services				
<b>3. Operating Expenditure</b>	<b>116.644.791</b>	<b>130.974.234</b>	<b>174.552.788</b>	<b>196.591.380</b>
3.1. Non-member activities				
3.2. Eurocontrol contribution WAVE 1 projects	71.232.598	73.388.642	81.733.361	136.023.097
3.3. Other members contribution WAVE 1 projects	45.412.193	57.585.592	92.819.427	60.568.283
<b>TOTAL EXPENDITURE</b>	<b>116.644.791</b>	<b>130.974.234</b>	<b>174.552.788</b>	<b>196.591.380</b>

Table 32: Detailed SESAR 2020 In-Kind Expenditure Budget over the period 2017 – 2020 (N to N+3) – Commitment appropriations

## Detailed SJU Expenditure Budget over the period – (N-1 to N+3) – Commitment appropriations

EXPENDITURE	Commitment appropriations (in €)						
	Executed Budget N-1 (2016)	Budget N (2017)	Budget N+1 (2018)		VAR N+1 / N	Budget N+2 (2019)	Budget N+3 (2020)
			Agency request	Budget Forecast			
<b>Title 1 - Staff Expenditure</b>	<b>6.191.500</b>	<b>6.160.000</b>	<b>6.040.300</b>	<b>6.040.300</b>		<b>6.044.372</b>	<b>6.157.360</b>
11 Salaries & allowances	5.496.500	5.495.000	5.465.300	5.465.300	(0,5)%	5.517.372	5.630.360
- of which establishment plan posts	5.126.500	5.130.000	5.261.300	5.261.300	2,6%	5.309.292	5.418.118
- of which external personnel	370.000	365.000	204.000	204.000	(44,1)%	208.080	212.242
12 Expenditure relating to Staff recruitment	-	15.000	15.000	15.000	-	15.000	15.000
13 Mission expenses	500.000	470.000	335.000	335.000	(28,7)%	335.000	300.000
14 Socio-medical infrastructure	-	-	-	-	-	-	-
15 Training	-	85.000	50.000	50.000	(41,2)%	50.000	85.000
16 External Services	-	60.000	140.000	140.000	133,3%	92.000	92.000
17 Receptions and events	-	-	-	-	-	-	-
19 Other Staff related expenditure	195.000	35.000	35.000	35.000	-	35.000	35.000
<b>Title 2 - Infrastructure and operating expenditure</b>	<b>4.058.500</b>	<b>4.180.351</b>	<b>3.476.234</b>	<b>3.476.234</b>		<b>3.612.935</b>	<b>3.417.079</b>
20 Rental of buildings and associated costs <sup>[1]</sup>	978.500	819.816	963.820	963.820	17,6%	983.096	901.579
21 Information and communication technology	2.075.000	1.865.784	1.535.000	1.535.000	(17,7)%	1.563.000	1.462.000
22 Movable property and associated costs	100.000	55.000	62.018	62.018	12,8%	63.258	100.000
23 Current administrative expenditure	359.000	926.560	497.696	497.696	(46,3)%	585.880	550.500
24 Postage / Telecommunications	141.000	51.500	-	-	(100,0)%	-	-
25 Meeting expenses	20.000	50.000	19.700	19.700	(60,6)%	19.700	50.000
26 Running costs in connection with operational activities	-	-	-	-	-	-	-
27 Information and publishing	385.000	411.691	398.000	398.000	(3,3)%	398.000	353.000
28 Studies	-	-	-	-	-	-	-

<b>Title 3 - Operational expenditure</b>	<b>88.823.761</b>	<b>103.005.914</b>	<b>120.001.228</b>	<b>120.001.228</b>		<b>108.390.450</b>	<b>102.294.156</b>
SESAR 1 - 3.1 Studies/Development Conducted By the SJU	26.685.761	1.229.808	-	-	(100,0)%	-	-
SESAR 1 - 3.2 Studies/Development Conducted By EUROCONTROL	-	-	-	-	-	-	-
SESAR 1 - 3.3 Studies/Development Conducted By Other Members	-	137.608	-	-	(100,0)%	-	-
SESAR 2020 3.1 - Providing Strategic Steering to the SESAR programme	2.768.000	6.235.737	5.925.014	5.925.014	(5,0)%	2.958.024	499.949
SESAR 2020 3.2 - Deliver Exploratory Research	19.210.000	-	54.500	54.500	-	40.885.500	-
SESAR 2020 3.3 - Deliver Industrial Research and Validation	16.200.000	80.072.355	89.525.998	89.525.998	11,8%	34.710.325	86.478.327
SESAR 2020 3.4 - Deliver Very Large-Scale Demonstration activities	18.500.000	15.330.406	24.230.715	24.230.715	58,1%	27.566.601	15.260.881
SESAR 2020 3.5 - Deliver SESAR Outreach	5.460.000	-	265.000	265.000	-	2.270.000	55.000
<b>TOTAL EXPENDITURE</b>	<b>99.073.761</b>	<b>113.346.265</b>	<b>129.517.762</b>	<b>129.517.762</b>		<b>118.047.757</b>	<b>111.868.595</b>

<sup>[1]</sup> Including possible repayment of interest; detailed information as regards building policy can be found in Annex V

## Detailed SJU Expenditure Budget over the period – (N-1 to N+3) – Commitment appropriations

EXPENDITURE	Commitment appropriations (in €)						
	Executed Budget N-1 (2016)	Budget N (2017)	Budget N+1 (2018)		VAR N+1 / N	Budget N+2 (2019)	Budget N+3 (2020)
			Agency request	Budget Forecast			
<b>Title 1 - Staff Expenditure</b>	<b>6.191.500</b>	<b>6.160.000</b>	<b>6.040.300</b>	<b>6.040.300</b>		<b>6.044.372</b>	<b>6.157.360</b>
11 Salaries & allowances	5.496.500	5.495.000	5.465.300	5.465.300	(0,5)%	5.517.372	5.630.360
- of which establishment plan posts	5.126.500	4.730.000	4.853.300	4.853.300	2,6%	4.893.132	4.993.635
- of which external personnel	370.000	765.000	612.000	612.000	(20,0)%	624.240	636.725
12 Expenditure relating to Staff recruitment	-	15.000	15.000	15.000	-	15.000	15.000
13 Mission expenses	500.000	470.000	335.000	335.000	(28,7)%	335.000	300.000
14 Socio-medical infrastructure	-	-	-	-	-	-	-
15 Training	-	85.000	50.000	50.000	(41,2)%	50.000	85.000
16 External Services	-	60.000	140.000	140.000	133,3%	92.000	92.000
17 Receptions and events	-	-	-	-	-	-	-
19 Other Staff related expenditure	195.000	35.000	35.000	35.000	-	35.000	35.000
<b>Title 2 - Infrastructure and operating expenditure</b>	<b>4.058.500</b>	<b>4.180.351</b>	<b>3.476.234</b>	<b>3.476.234</b>		<b>3.612.935</b>	<b>3.417.079</b>
20 Rental of buildings and associated costs <sup>[1]</sup>	978.500	819.816	963.820	963.820	17,6%	983.096	901.579
21 Information and communication technology	2.075.000	1.865.784	1.535.000	1.535.000	(17,7)%	1.563.000	1.462.000
22 Movable property and associated costs	100.000	55.000	62.018	62.018	12,8%	63.258	100.000
23 Current administrative expenditure	359.000	926.560	497.696	497.696	(46,3)%	585.880	550.500
24 Postage / Telecommunications	141.000	51.500	-	-	(100,0)%	-	-
25 Meeting expenses	20.000	39.950	19.700	19.700	(50,7)%	19.700	50.000
26 Running costs in connection with operational activities	-	-	-	-	-	-	-
27 Information and publishing	385.000	421.741	398.000	398.000	(5,6)%	398.000	353.000
28 Studies	-	-	-	-	-	-	-

<b>Title 3 - Operational expenditure</b>	<b>88.823.761</b>	<b>103.005.914</b>	<b>143.921.427</b>	<b>143.921.427</b>		<b>108.390.450</b>	<b>102.294.157</b>
SESAR 1 - 3.1 Studies/Development Conducted By the SJU	26.685.761	1.229.808	-	-	(100,0)%	-	-
SESAR 1 - 3.2 Studies/Development Conducted By EUROCONTROL	-	-	-	-	-	-	-
SESAR 1 - 3.3 Studies/Development Conducted By Other Members	-	137.608	-	-	(100,0)%	-	-
SESAR 2020 3.1 - Providing Strategic Steering to the SESAR programme	2.768.000	6.235.737	6.725.014	6.725.014	7,8%	2.958.024	499.949
SESAR 2020 3.2 - Deliver Exploratory Research	19.210.000	-	1.047.374	1.047.374	-	40.885.500	-
SESAR 2020 3.3 - Deliver Industrial Research and Validation	16.200.000	80.072.355	98.493.896	98.493.896	23,0%	34.710.325	86.478.327
SESAR 2020 3.4 - Deliver Very Large-Scale Demonstration activities	18.500.000	15.330.406	36.614.631	36.614.631	138,8%	27.566.601	15.260.881
SESAR 2020 3.5 - Deliver SESAR Outreach	5.460.000	-	1.040.512	1.040.512	-	2.270.000	55.000
<b>TOTAL EXPENDITURE</b>	<b>99.073.761</b>	<b>113.346.265</b>	<b>153.437.961</b>	<b>153.437.961</b>		<b>118.047.757</b>	<b>111.868.596</b>

<sup>[1]</sup> Including possible repayment of interest; detailed information as regards building policy can be found in Annex V

**Table 33: Detailed SJU whole Expenditure Budget over the period 2016 – 2020 (N-1 to N+3) – Commitment appropriations**



**Detailed SJU Expenditure Budget over the period – (N-1 to N+3) – Commitment appropriations**

EXPENDITURE	Commitment appropriations (in €)						
	Executed Budget N-1 (2016)	Budget N (2017)	Budget N+1 (2018)		VAR N+1 / N	Budget N+2 (2019)	Budget N+3 (2020)
			Agency request	Budget Forecast			
<b>Title 1 - Staff Expenditure</b>	<b>6.191.500</b>	<b>165.000</b>	-	-		-	-
11 Salaries & allowances	5.496.500	165.000	-	-	(100,0)%	-	-
- of which establishment plan posts	5.126.500	-	-	-	-	-	-
- of which external personnel	370.000	165.000	-	-	(100,0)%	-	-
12 Expenditure relating to Staff recruitment	-	-	-	-	-	-	-
13 Mission expenses	500.000	-	-	-	-	-	-
14 Socio-medical infrastructure							
15 Training	-	-	-	-	-	-	-
16 External Services	-	-	-	-	-	-	-
17 Receptions and events							
19 Other Staff related expenditure	195.000	-	-	-	-	-	-
<b>Title 2 - Infrastructure and operating expenditure</b>	<b>4.058.500</b>	<b>421.844</b>	-	-		-	-
20 Rental of buildings and associated costs <sup>[1]</sup>	978.500	-	-	-	-	-	-
21 Information and communication technology	2.075.000	104.470	-	-	(100,0)%	-	-
22 Movable property and associated costs	100.000	-	-	-	-	-	-
23 Current administrative expenditure	359.000	275.874	-	-	(100,0)%	-	-
24 Postage / Telecommunications	141.000	41.500	-	-	(100,0)%	-	-
25 Meeting expenses	20.000	-	-	-	-	-	-
26 Running costs in connection with operational activities	-	-	-	-	-	-	-
27 Information and publishing	385.000	-	-	-	-	-	-
28 Studies	-	-	-	-	-	-	-
<b>Title 3 - Operational expenditure</b>	<b>26.685.761</b>	<b>1.367.416</b>	-	-		-	-
3.1 Studies/Development Conducted By the SJU	26.685.761	1.229.808	-	-	(100,0)%	-	-
3.2 Studies/Development Conducted By EUROCONTROL	-	-	-	-	-	-	-
3.3 Studies/Development Conducted By Other Members	-	137.608	-	-	(100,0)%	-	-
<b>TOTAL EXPENDITURE</b>	<b>36.935.761</b>	<b>1.954.260</b>	-	-		-	-

Table 34: Detailed SESAR 1 Expenditure Budget over the period 2016 – 2020 (N-1 to N+3) – Commitment appropriations

## Detailed SJU Expenditure Budget over the period – (N-1 to N+3) – Commitment appropriations

EXPENDITURE	Commitment appropriations (in €)						
	Executed Budget N-1 (2016)	Budget N (2017)	Budget N+1 (2018)		VAR N+1 / N	Budget N+2 (2019)	Budget N+3 (2020)
			Agency request	Budget Forecast			
<b>Title 1 - Staff Expenditure</b>	-	<b>5.995.000</b>	<b>6.040.300</b>	<b>6.040.300</b>		<b>6.044.372</b>	<b>6.157.360</b>
11 Salaries & allowances	-	5.330.000	5.465.300	5.465.300	2,5%	5.517.372	5.630.360
- of which establishment plan posts	-	5.130.000	5.261.300	5.261.300	2,6%	5.309.292	5.418.118
- of which external personnel	-	200.000	204.000	204.000	2,0%	208.080	212.242
12 Expenditure relating to Staff recruitment	-	15.000	15.000	15.000	-	15.000	15.000
13 Mission expenses	-	470.000	335.000	335.000	(28,7)%	335.000	300.000
14 Socio-medical infrastructure							
15 Training	-	85.000	50.000	50.000	(41,2)%	50.000	85.000
16 External Services	-	60.000	140.000	140.000	133,3%	92.000	92.000
17 Receptions and events							
19 Other Staff related expenditure	-	35.000	35.000	35.000	-	35.000	35.000
<b>Title 2 - Infrastructure and operating expenditure</b>	-	<b>3.758.507</b>	<b>3.476.234</b>	<b>3.476.234</b>		<b>3.612.935</b>	<b>3.417.079</b>
20 Rental of buildings and associated costs <sup>[1]</sup>	-	819.816	963.820	963.820	17,6%	983.096	901.579
21 Information and communication technology	-	1.761.314	1.535.000	1.535.000	(12,8)%	1.563.000	1.462.000
22 Movable property and associated costs	-	55.000	62.018	62.018	12,8%	63.258	100.000
23 Current administrative expenditure	-	650.686	497.696	497.696	(23,5)%	585.880	550.500
24 Postage / Telecommunications	-	10.000	-	-	(100,0)%	-	-
25 Meeting expenses	-	50.000	19.700	19.700	(60,6)%	19.700	50.000
26 Running costs in connection with operational activities							
27 Information and publishing	-	411.691	398.000	398.000	(3,3)%	398.000	353.000
28 Studies							
<b>Title 3 - Operational expenditure</b>	<b>62.138.000</b>	<b>101.638.498</b>	<b>120.001.228</b>	<b>120.001.228</b>		<b>108.390.450</b>	<b>102.294.156</b>
3.1 - Providing Strategic Steering to the SESAR programme	2.768.000	6.235.737	5.925.014	5.925.014	(5,0)%	2.958.024	499.949
3.2 - Deliver Exploratory Research	19.210.000	-	54.500	54.500	-	40.885.500	-
3.3 - Deliver Industrial Research and Validation	16.200.000	80.072.355	89.525.998	89.525.998	11,8%	34.710.325	86.478.327
3.4 - Deliver Very Large-Scale Demonstration activities	18.500.000	15.330.406	24.230.715	24.230.715	58,1%	27.566.601	15.260.881
3.5 - Deliver SESAR Outreach	5.460.000	-	265.000	265.000	-	2.270.000	55.000
<b>TOTAL EXPENDITURE</b>	<b>62.138.000</b>	<b>111.392.005</b>	<b>129.517.762</b>	<b>129.517.762</b>		<b>118.047.757</b>	<b>111.868.595</b>

<sup>[1]</sup> Including possible repayment of interest; detailed information as regards building policy can be found in Annex V

## Detailed SJU Expenditure Budget over the period – (N-1 to N+3) – Commitment appropriations

EXPENDITURE	Commitment appropriations (in €)						
	Executed Budget N-1 (2016)	Budget N (2017)	Budget N+1 (2018)		VAR N+1 / N	Budget N+2 (2019)	Budget N+3 (2020)
			Agency request	Budget Forecast			
<b>Title 1 - Staff Expenditure</b>	-	<b>5.995.000</b>	<b>6.040.300</b>	<b>6.040.300</b>		<b>6.044.372</b>	<b>6.157.360</b>
11 Salaries & allowances	-	5.330.000	5.465.300	5.465.300	2,5%	5.517.372	5.630.360
- of which establishment plan posts	-	4.730.000	4.853.300	4.853.300	2,6%	4.893.132	4.993.635
- of which external personnel	-	600.000	612.000	612.000	2,0%	624.240	636.725
12 Expenditure relating to Staff recruitment	-	15.000	15.000	15.000	-	15.000	15.000
13 Mission expenses	-	470.000	335.000	335.000	(28,7)%	335.000	300.000
14 Socio-medical infrastructure							
15 Training	-	85.000	50.000	50.000	(41,2)%	50.000	85.000
16 External Services	-	60.000	140.000	140.000	133,3%	92.000	92.000
17 Receptions and events							
19 Other Staff related expenditure	-	35.000	35.000	35.000	-	35.000	35.000
<b>Title 2 - Infrastructure and operating expenditure</b>	-	<b>3.758.507</b>	<b>3.476.234</b>	<b>3.476.234</b>		<b>3.612.935</b>	<b>3.417.079</b>
20 Rental of buildings and associated costs <sup>[1]</sup>	-	819.816	963.820	963.820	17,6%	983.096	901.579
21 Information and communication technology	-	1.761.314	1.535.000	1.535.000	(12,8)%	1.563.000	1.462.000
22 Movable property and associated costs	-	55.000	62.018	62.018	12,8%	63.258	100.000
23 Current administrative expenditure	-	650.686	497.696	497.696	(23,5)%	585.880	550.500
24 Postage / Telecommunications	-	10.000	-	-	(100,0)%	-	-
25 Meeting expenses	-	39.950	19.700	19.700	(50,7)%	19.700	50.000
26 Running costs in connection with operational activities							
27 Information and publishing	-	421.741	398.000	398.000	(5,6)%	398.000	353.000
28 Studies							
<b>Title 3 - Operational expenditure</b>	<b>62.138.000</b>	<b>101.638.498</b>	<b>143.921.427</b>	<b>143.921.427</b>		<b>108.390.450</b>	<b>102.294.157</b>
3.1 - Providing Strategic Steering to the SESAR programme	2.768.000	6.235.737	6.725.014	6.725.014	7,8%	2.958.024	499.949
3.2 - Deliver Exploratory Research	19.210.000	-	1.047.374	1.047.374	-	40.885.500	-
3.3 - Deliver Industrial Research and Validation	16.200.000	80.072.355	98.493.896	98.493.896	23,0%	34.710.325	86.478.327
3.4 - Deliver Very Large-Scale Demonstration activities	18.500.000	15.330.406	36.614.631	36.614.631	138,8%	27.566.601	15.260.881
3.5 - Deliver SESAR Outreach	5.460.000	-	1.040.512	1.040.512	-	2.270.000	55.000
<b>TOTAL EXPENDITURE</b>	<b>62.138.000</b>	<b>111.392.005</b>	<b>153.437.961</b>	<b>153.437.961</b>		<b>118.047.757</b>	<b>111.868.596</b>

<sup>[1]</sup> Including possible repayment of interest; detailed information as regards building policy can be found in Annex V

Table 35: Detailed SESAR 2020 Expenditure Budget over the period 2016 – 2020 (N-1 to N+3) – Commitment appropriations

## Detailed SJU Expenditure Budget over the period – (N-1 to N+3) – Payment appropriations

EXPENDITURE	Payment appropriations (in €)						
	Executed Budget N-1 (2016)	Budget N (2017)	Budget N+1 (2018)		VAR N+1 / N	Budget N+2 (2019)	Budget N+3 (2020)
			Agency request	Budget Forecast			
<b>Title 1 - Staff Expenditure</b>	<b>6.191.500</b>	<b>6.160.000</b>	<b>6.040.300</b>	<b>6.040.300</b>		<b>6.044.372</b>	<b>6.157.360</b>
11 Salaries & allowances	5.496.500	5.495.000	5.465.300	5.465.300	(0,5)%	5.517.372	5.630.360
- of which establishment plan posts	5.126.500	5.130.000	5.261.300	5.261.300	2,6%	5.309.292	5.418.118
- of which external personnel	370.000	365.000	204.000	204.000	(44,1)%	208.080	212.242
12 Expenditure relating to Staff recruitment	-	15.000	15.000	15.000	-	15.000	15.000
13 Mission expenses	500.000	470.000	335.000	335.000	(28,7)%	335.000	300.000
14 Socio-medical infrastructure	-	-	-	-	-	-	-
15 Training	-	85.000	50.000	50.000	(41,2)%	50.000	85.000
16 External Services	-	60.000	140.000	140.000	133,3%	92.000	92.000
17 Receptions and events	-	-	-	-	-	-	-
19 Other Staff related expenditure	195.000	35.000	35.000	35.000	-	35.000	35.000
<b>Title 2 - Infrastructure and operating expenditure</b>	<b>4.058.500</b>	<b>4.180.351</b>	<b>3.476.234</b>	<b>3.476.234</b>		<b>3.612.935</b>	<b>3.417.079</b>
20 Rental of buildings and associated costs[*]	978.500	819.816	963.820	963.820	17,6%	983.096	901.579
21 Information and communication technology	2.075.000	1.865.784	1.535.000	1.535.000	(17,7)%	1.563.000	1.462.000
22 Movable property and associated costs	100.000	55.000	62.018	62.018	12,8%	63.258	100.000
23 Current administrative expenditure	359.000	926.560	497.696	497.696	(46,3)%	585.880	550.500
24 Postage / Telecommunications	141.000	51.500	-	-	(100,0)%	-	-
25 Meeting expenses	20.000	50.000	19.700	19.700	(60,6)%	19.700	50.000
26 Running costs in connection with operational activities	-	-	-	-	-	-	-
27 Information and publishing	385.000	411.691	398.000	398.000	(3,3)%	398.000	353.000
28 Studies	-	-	-	-	-	-	-



<b>Title 3 - Operational expenditure</b>	<b>94.545.297</b>	<b>181.473.032</b>	<b>85.272.880</b>	<b>85.272.880</b>		<b>110.270.392</b>	<b>88.477.867</b>
SESAR 1 - 3.1 Studies/Development Conducted By the SJU	38.026.072	23.096.479	-	-	(100,0)%	-	-
SESAR 1 - 3.2 Studies/Development Conducted By EUROCONTROL	-	-	-	-	0,0%	-	-
SESAR 1 - 3.3 Studies/Development Conducted By Other Members	-	77.231.070	-	-	(100,0)%	-	-
SESAR 2020 3.1 - Providing Strategic Steering to the SESAR programme	2.272.737	4.642.255	5.641.085	5.641.085	21,5%	5.627.459	2.794.109
SESAR 2020 3.2 - Deliver Exploratory Research	16.319.225	10.221.984	201.500	201.500	(98,0)%	17.305.000	8.670.511
SESAR 2020 3.3 - Deliver Industrial Research and Validation	31.808.510	54.571.756	63.524.186	63.524.186	16,4%	59.355.689	55.860.922
SESAR 2020 3.4 - Deliver Very Large-Scale Demonstration activities	6.118.753	10.904.487	13.971.108	13.971.108	28,1%	26.162.243	19.342.324
SESAR 2020 3.5 - Deliver SESAR Outreach	-	805.000	1.935.000	1.935.000	140,4%	1.820.000	1.810.000
<b>TOTAL EXPENDITURE</b>	<b>104.795.297</b>	<b>191.813.383</b>	<b>94.789.414</b>	<b>94.789.414</b>		<b>119.927.698</b>	<b>98.052.306</b>

[<sup>1</sup>] Including possible repayment of interest; detailed information as regards building policy can be found in Annex V

## Detailed SJU Expenditure Budget over the period – (N-1 to N+3) – Payment appropriations

EXPENDITURE	Payment appropriations (in €)						
	Executed Budget N-1 (2016)	Budget N (2017)	Budget N+1 (2018)		VAR N+1 / N	Budget N+2 (2019)	Budget N+3 (2020)
			Agency request	Budget Forecast			
<b>Title 1 - Staff Expenditure</b>	<b>6.191.500</b>	<b>6.160.000</b>	<b>6.040.300</b>	<b>6.040.300</b>		<b>6.044.372</b>	<b>6.157.360</b>
11 Salaries & allowances	5.496.500	5.495.000	5.465.300	5.465.300	(0,5)%	5.517.372	5.630.360
- of which establishment plan posts	5.126.500	4.730.000	4.853.300	4.853.300	2,6%	4.893.132	4.993.635
- of which external personnel	370.000	765.000	612.000	612.000	(20,0)%	624.240	636.725
12 Expenditure relating to Staff recruitment	-	15.000	15.000	15.000	-	15.000	15.000
13 Mission expenses	500.000	470.000	335.000	335.000	(28,7)%	335.000	300.000
14 Socio-medical infrastructure	-	-	-	-	-	-	-
15 Training	-	85.000	50.000	50.000	(41,2)%	50.000	85.000
16 External Services	-	60.000	140.000	140.000	133,3%	92.000	92.000
17 Receptions and events	-	-	-	-	-	-	-
19 Other Staff related expenditure	195.000	35.000	35.000	35.000	-	35.000	35.000
<b>Title 2 - Infrastructure and operating expenditure</b>	<b>4.058.500</b>	<b>4.180.351</b>	<b>3.476.234</b>	<b>3.476.234</b>		<b>3.612.935</b>	<b>3.417.079</b>
20 Rental of buildings and associated costs[*]	978.500	819.816	963.820	963.820	17,6%	983.096	901.579
21 Information and communication technology	2.075.000	1.865.784	1.535.000	1.535.000	(17,7)%	1.563.000	1.462.000
22 Movable property and associated costs	100.000	55.000	62.018	62.018	12,8%	63.258	100.000
23 Current administrative expenditure	359.000	926.560	497.696	497.696	(46,3)%	585.880	550.500
24 Postage / Telecommunications	141.000	51.500	-	-	(100,0)%	-	-
25 Meeting expenses	20.000	39.950	19.700	19.700	(50,7)%	19.700	50.000
26 Running costs in connection with operational activities	-	-	-	-	-	-	-
27 Information and publishing	385.000	421.741	398.000	398.000	(5,6)%	398.000	353.000
28 Studies	-	-	-	-	-	-	-



<b>Title 3 - Operational expenditure</b>	<b>94.545.297</b>	<b>181.473.032</b>	<b>131.392.685</b>	<b>131.392.685</b>		<b>110.270.391</b>	<b>88.477.866</b>
SESAR 1 - 3.1 Studies/Development Conducted By the SJU	38.026.072	23.096.479	4.403.499	4.403.499	(80,9)%	-	-
SESAR 1 - 3.2 Studies/Development Conducted By EUROCONTROL	-	-	-	-	0,0%	-	-
SESAR 1 - 3.3 Studies/Development Conducted By Other Members	-	77.231.070	16.591.794	16.591.794	(78,5)%	-	-
SESAR 2020 3.1 - Providing Strategic Steering to the SESAR programme	2.272.737	4.642.255	7.650.826	7.650.826	64,8%	5.627.459	2.794.109
SESAR 2020 3.2 - Deliver Exploratory Research	16.319.225	10.221.984	16.315.319	16.315.319	59,6%	17.305.000	8.670.511
SESAR 2020 3.3 - Deliver Industrial Research and Validation	31.808.510	54.571.756	58.819.683	58.819.683	7,8%	59.355.689	55.860.922
SESAR 2020 3.4 - Deliver Very Large-Scale Demonstration activities	6.118.753	10.904.487	24.901.051	24.901.051	128,4%	26.162.243	19.342.324
SESAR 2020 3.5 - Deliver SESAR Outreach	-	805.000	2.710.512	2.710.512	236,7%	1.820.000	1.810.000
<b>TOTAL EXPENDITURE</b>	<b>104.795.297</b>	<b>191.813.383</b>	<b>140.909.219</b>	<b>140.909.219</b>		<b>119.927.698</b>	<b>98.052.305</b>

<sup>[1]</sup> Including possible repayment of interest; detailed information as regards building policy can be found in Annex V

**Table 36: Detailed SJU whole Expenditure Budget over the period 2016 – 2020 (N-1 to N+3) – Payment appropriations**

## Detailed SJU Expenditure Budget over the period – (N-1 to N+3) – Payment appropriations

EXPENDITURE	Payment appropriations (in €)						
	Executed Budget N-1 (2016)	Budget N (2017)	Budget N+1 (2018)		VAR N+1 / N	Budget N+2 (2019)	Budget N+3 (2020)
			Agency request	Budget Forecast			
<b>Title 1 - Staff Expenditure</b>	<b>6.191.500</b>	<b>165.000</b>	-	-	-	-	-
11 Salaries & allowances	5.496.500	165.000	-	-	(100,0)%	-	-
- of which establishment plan posts	5.126.500	-	-	-	-	-	-
- of which external personnel	370.000	165.000	-	-	(100,0)%	-	-
12 Expenditure relating to Staff recruitment	-	-	-	-	-	-	-
13 Mission expenses	500.000	-	-	-	-	-	-
14 Socio-medical infrastructure	-	-	-	-	-	-	-
15 Training	-	-	-	-	-	-	-
16 External Services	-	-	-	-	-	-	-
17 Receptions and events	-	-	-	-	-	-	-
19 Other Staff related expenditure	195.000	-	-	-	-	-	-
<b>Title 2 - Infrastructure and operating expenditure</b>	<b>4.058.500</b>	<b>421.844</b>	-	-	-	-	-
20 Rental of buildings and associated costs <sup>[1]</sup>	978.500	-	-	-	-	-	-
21 Information and communication technology	2.075.000	104.470	-	-	(100,0)%	-	-
22 Movable property and associated costs	100.000	-	-	-	-	-	-
23 Current administrative expenditure	359.000	275.874	-	-	(100,0)%	-	-
24 Postage / Telecommunications	141.000	41.500	-	-	(100,0)%	-	-
25 Meeting expenses	20.000	-	-	-	-	-	-
26 Running costs in connection with operational activities	-	-	-	-	-	-	-
27 Information and publishing	385.000	-	-	-	-	-	-
28 Studies	-	-	-	-	-	-	-
<b>Title 3 - Operational expenditure</b>	<b>38.026.072</b>	<b>100.327.549</b>	-	-	-	-	-
3.1 Studies/Development Conducted By The SJU (BO3100)	38.026.072	23.096.479	-	-	(100,0)%	-	-
3.2 Studies/Development Conducted By EUROCONTROL (BO3200 Cash)	-	-	-	-	-	-	-
3.3 Studies/Development Conducted By Other Members (BO3300 Cash)	-	77.231.070	-	-	(100,0)%	-	-
<b>TOTAL EXPENDITURE</b>	<b>48.276.072</b>	<b>100.914.393</b>	-	-	-	-	-

<sup>[1]</sup> Including possible repayment of interest; detailed information as regards building policy can be found in Annex V

Table 37: Detailed SESAR 1 Expenditure Budget over the period 2016 – 2020 (N-1 to N+3) – Payment appropriations





Founding Members



## Detailed SJU Expenditure Budget over the period – (N-1 to N+3) – Payment appropriations

EXPENDITURE	Payment appropriations (in €)						
	Executed Budget N-1 (2016)	Budget N (2017)	Budget N+1 (2018)		VAR N+1 / N	Budget N+2 (2019)	Budget N+3 (2020)
			Agency request	Budget Forecast			
<b>Title 1 - Staff Expenditure</b>	-	<b>5.995.000</b>	<b>6.040.300</b>	<b>6.040.300</b>		<b>6.044.372</b>	<b>6.157.360</b>
11 Salaries & allowances	-	5.330.000	5.465.300	5.465.300	2,5%	5.517.372	5.630.360
- of which establishment plan posts	-	4.730.000	4.853.300	4.853.300	2,6%	4.893.132	4.993.635
- of which external personnel	-	600.000	612.000	612.000	2,0%	624.240	636.725
12 Expenditure relating to Staff recruitment	-	15.000	15.000	15.000	-	15.000	15.000
13 Mission expenses	-	470.000	335.000	335.000	(28,7)%	335.000	300.000
14 Socio-medical infrastructure							
15 Training	-	85.000	50.000	50.000	(41,2)%	50.000	85.000
16 External Services	-	60.000	140.000	140.000	133,3%	92.000	92.000
17 Receptions and events							
19 Other Staff related expenditure	-	35.000	35.000	35.000	-	35.000	35.000
<b>Title 2 - Infrastructure and operating expenditure</b>	-	<b>3.758.507</b>	<b>3.476.234</b>	<b>3.476.234</b>		<b>3.612.935</b>	<b>3.417.079</b>
20 Rental of buildings and associated costs[*]	-	819.816	963.820	963.820	17,6%	983.096	901.579
21 Information and communication technology	-	1.761.314	1.535.000	1.535.000	(12,8)%	1.563.000	1.462.000
22 Movable property and associated costs	-	55.000	62.018	62.018	12,8%	63.258	100.000
23 Current administrative expenditure	-	650.686	497.696	497.696	(23,5)%	585.880	550.500
24 Postage / Telecommunications	-	10.000	-	-	(100,0)%	-	-
25 Meeting expenses	-	39.950	19.700	19.700	(50,7)%	19.700	50.000
26 Running costs in connection with operational activities							
27 Information and publishing	-	421.741	398.000	398.000	(5,6)%	398.000	353.000
28 Studies							
<b>Title 3 - Operational expenditure</b>	<b>56.519.225</b>	<b>81.145.482</b>	<b>110.397.392</b>	<b>110.397.392</b>		<b>110.270.391</b>	<b>88.477.866</b>
3.1 - Providing Strategic Steering to the SESAR programme	2.272.737	4.642.255	7.650.826	7.650.826	64,8%	5.627.459	2.794.109
3.2 - Deliver Exploratory Research	16.319.225	10.221.984	16.315.319	16.315.319	59,6%	17.305.000	8.670.511
3.3 - Deliver Industrial Research and Validation	31.808.510	54.571.756	58.819.683	58.819.683	7,8%	59.355.689	55.860.922
3.4 - Deliver Very Large-Scale Demonstration activities	6.118.753	10.904.487	24.901.051	24.901.051	128,4%	26.162.243	19.342.324
3.5 - Deliver SESAR Outreach	-	805.000	2.710.512	2.710.512	236,7%	1.820.000	1.810.000
<b>TOTAL EXPENDITURE</b>	<b>56.519.225</b>	<b>90.898.989</b>	<b>119.913.926</b>	<b>119.913.926</b>		<b>119.927.698</b>	<b>98.052.305</b>

[\*] Including possible repayment of interest; detailed information as regards building policy can be found in Annex V

Table 38: Detailed SESAR 2020 Expenditure Budget over the period 2016 – 2020 (N-1 to N+3) – Payment appropriations

Detailed breakdown of SJU SESAR 2020 Expenditure Budget per Chapter:

## STATEMENT OF EXPENDITURE

all figures in Euro

Title / Chapter	Programme estimates	Commitment Appropriations				Payment Appropriations			
		Budget 2015	Budget 2016	Budget 2017	Budget 2018	Budget 2015	Budget 2.016	Budget 2017	Budget 2018
<b>1. Staff Expenditure</b>	<b>44.498.542</b>			<b>5.995.000</b>	<b>6.040.300</b>			<b>5.995.000</b>	<b>6.040.300</b>
1.1. Staff Expenditure As Per Staff Establish. Plan	33.648.516			4.340.000	4.523.300			4.340.000	4.523.300
1.2. Contract Agents, Interim Staff	5.311.170			790.000	738.000			790.000	738.000
1.4. Seconded National Experts	1.486.856			200.000	204.000			200.000	204.000
1.5. Mission Costs	2.445.000			470.000	335.000			470.000	335.000
1.6. Other Staff Expenditure	1.607.000			195.000	240.000			195.000	240.000
<b>2. Administrative Expenditure</b>	<b>26.489.757</b>			<b>3.758.507</b>	<b>3.476.234</b>			<b>3.758.507</b>	<b>3.476.234</b>
2.1. Rental Of Buildings And Associated Costs	7.468.813			819.816	963.820			819.816	963.820
2.2. Movable Property And Associated Costs	590.276			55.000	62.018			55.000	62.018
2.3. PR And Events	2.582.741			421.741	398.000			421.741	398.000
2.4. Postage	10.000			10.000	10.000			10.000	10.000
2.5. Governance Expenditure	329.350			39.950	19.700			39.950	19.700
2.6. Current Administrative Expenditure	2.680.056			320.686	213.696			320.686	213.696
2.7. ICT and Unified Communications	11.139.314			1.761.314	1.535.000			1.761.314	1.535.000
2.8. Administrative Support Services	1.689.206			330.000	284.000			330.000	284.000
<b>3. Operating Expenditure</b>	<b>590.970.200</b>	<b>51.470.000</b>	<b>62.138.000</b>	<b>101.638.498</b>	<b>143.921.427</b>	<b>10.300.000</b>	<b>56.519.225</b>	<b>81.145.482</b>	<b>110.397.392</b>
3.1. Providing Strategic Steering to the SESAR programme	23.682.602	2.590.922	2.768.000	6.235.737	6.725.014		2.272.737	4.642.255	7.650.826
3.2. Deliver Exploratory Research	83.144.450		19.210.000		1.047.374	10.300.000	16.319.225	10.221.984	16.315.319
3.3. Deliver Industrial Research and Validation	357.185.408	41.230.637	16.200.000	80.072.355	98.493.896		31.808.510	54.571.756	58.819.683
3.4. Deliver Very Large-Scale Demonstration activities	118.082.228	7.648.441	18.500.000	15.330.406	36.614.631		6.118.753	10.904.487	24.901.051
3.5. Deliver SESAR Outreach	8.875.512		5.460.000		1.040.512			805.000	2.710.512
<b>TOTAL EXPENDITURE</b>	<b>661.958.499</b>	<b>51.470.000</b>	<b>62.138.000</b>	<b>111.392.005</b>	<b>153.437.961</b>	<b>10.300.000</b>	<b>56.519.225</b>	<b>90.898.989</b>	<b>119.913.926</b>

Table 39: Detailed breakdown of SJU Expenditure Budget for SESAR 2020 per Chapter (N-2 – N+1)

## Table 2 – Revenue

In the tables below, the indicated EU contribution for 2018 is subject to the adoption of the DB 2018 by the budgetary authority and the EU contribution post 2018 is indicative figure subject to the outcome of future budgetary procedures.

### SJU Revenues in (year N) and (year N+1)

Revenues (in €)	N (2017)	N+1 (2018)
	Revenues estimated by the agency	Budget Forecast
EU contribution	103.240.000	122.563.000
Other revenue	10.106.265	30.874.961
<b>Total revenues</b>	<b>113.346.265</b>	<b>153.437.961</b>

Table 40: SJU whole Revenues in 2017 (year N) and 2018 (year N+1)

### SJU Revenues in (year N) and (year N+1)

Revenues (in €)	N (2017)	N+1 (2018)
	Revenues estimated by the agency	Budget Forecast
EU contribution	-	-
Other revenue	1.954.260	-
<b>Total revenues</b>	<b>1.954.260</b>	<b>-</b>

Table 41: SESAR 1 Revenues in 2017 (year N) and 2018 (year N+1)


**SJU Revenues in (year N) and (year N+1)**

Revenues (in €)	N (2017)	N+1 (2018)
	Revenues estimated by the agency	Budget Forecast
EU contribution	103.240.000	122.563.000
Other revenue	8.152.005	30.874.961
<b>Total revenues</b>	<b>111.392.005</b>	<b>153.437.961</b>

**Table 42: SESAR 2020 Revenues in 2017 (year N) and 2018 (year N+1)**

**IN-KIND CONTRIBUTION**

<i>all figures in Euro</i>	Revenue Entitlements			
	Budget 2017	Budget 2018	Budget 2019	Budget 2020
<b><u>Title / Chapter</u></b>				
<b>1. European Union Contribution</b>				
1.1 H2020 contribution to administrative expenditure				
1.2 H2020 contribution to operational expenditure				
1.3 Com/EP contribution to Very Large Scale Demos				
<b>2. Contribution from Eurocontrol</b>	<b>71.232.598</b>	<b>73.388.642</b>	<b>81.733.361</b>	<b>136.023.097</b>
2.1 contribution in cash				
2.2 contribution in kind	71.232.598	73.388.642	81.733.361	136.023.097
<b>3. Contributions from Other Members</b>	<b>45.412.193</b>	<b>57.585.592</b>	<b>92.819.427</b>	<b>60.568.283</b>
3.1 contribution in cash				
3.2 contribution in kind	45.412.193	57.585.592	92.819.427	60.568.283
<b>4. Other Revenue</b>				
4.1 Revenue From Interests Yielded				
4.2 Revenue From Taxes Recovered				
4.3 Programme revenues from non Members				
4.4 Exceptional Revenues				
4.5 Interest to be returned to the EU				
<b>Budget Outturn previous year</b>				
<b>TOTAL REVENUE</b>	<b>116.644.791</b>	<b>130.974.234</b>	<b>174.552.788</b>	<b>196.591.380</b>

Table 43: Detailed SESAR 2020 In-Kind Revenue Budget over the period 2017 – 2020 (N to N+3)

## Detailed SJU Revenue Budget over the period – (N-1 to N+3)

REVENUES (in €)	N-1 (2016)	N (2017)	N+1 (2018)	N+1 (2018)	VAR N+1 / N	Envisaged N+2 (2019)	Envisaged N+3 (2020)
	Executed Budget	Revenues estimated by the agency	As requested by the agency	Budget Forecast			
1 REVENUE FROM FEES AND CHARGES	3.247.346	-	-	-	-	-	-
2 EU CONTRIBUTION	60.500.000	100.800.000	120.000.000	120.000.000	0	110.000.000	105.480.506
- of which Administrative (Title 1 and Title 2) (Budget line 1100)	-	3.241.507	3.250.683	3.250.683	0,3%	3.330.000	3.330.000
- of which Operational (Title 3) (Budget line 1200 - EU)	60.000.000	96.758.493	106.749.317	106.749.317	10,3%	106.670.000	102.150.506
- of which assigned revenues deriving from additional budget (Budget line 1300)	500.000	800.000	10.000.000	10.000.000	1150,0%	-	-
3 THIRD COUNTRIES CONTRIBUTION (incl. EFTA and candidate countries)	1.638.000	2.440.000	2.563.000	2.563.000	0	2.563.000	2.457.696
- of which EFTA (Budget line 1200 - EFTA)	1.638.000	2.440.000	2.563.000	2.563.000	5,0%	2.563.000	2.457.696
- of which Candidate Countries							
4 OTHER CONTRIBUTIONS (Budget lines 2100 + 3100)	24.379.183	6.682.000	6.954.762	6.954.762	4,1%	6.954.762	6.954.762
- of which delegation agreement, ad hoc grants							
5 ADMINISTRATIVE OPERATIONS					-		
6 REVENUES FROM SERVICES RENDERED AGAINST PAYMENT	-	-	-	-	-	-	-
7 CORRECTION OF BUDGETARY IMBALANCES	-	-	-	-	-	-	-
8 INTERESTS GENERATED	100.000	-	-	-	-	-	-
9 UNUSED APPROPRIATIONS FROM PREVIOUS YEARS (Budget line 5100)	9.209.232	3.424.265	23.920.200	23.920.200	598,5%	1.470.005	3.024.368
<b>TOTAL REVENUES</b>	<b>99.073.761</b>	<b>113.346.265</b>	<b>153.437.961</b>	<b>153.437.961</b>		<b>118.047.757</b>	<b>111.868.595</b>

Table 44: Detailed SJU whole Revenue Budget (financial contribution) over the period 2016 – 2020 (N-1 to N+3)<sup>50</sup>

<sup>50</sup> Within EU contribution, the line 'of which assigned revenues deriving from additional budget' includes budget from the following budget lines:

**Detailed SJU Revenue Budget over the period – (N-1 to N+3)**

REVENUES (in €)	N-1 (2016)	N (2017)	N+1 (2018)	N+1 (2018)	VAR N+1 / N	Envisaged N+2 (2019)	Envisaged N+3 (2020)
	Executed Budget	Revenues estimated by the agency	As requested by the agency	Budget Forecast			
1 REVENUE FROM FEES AND CHARGES	3.247.346	-	-	-	-	-	-
2 EU CONTRIBUTION	-	-	-	-	-	-	-
- of which Administrative (Title 1 and Title 2) (Budget line 1100)	-	-	-	-	-	-	-
- of which Operational (Title 3) (Budget line 1200 - EU)	-	-	-	-	-	-	-
- of which assigned revenues deriving from additional budget (Budget line 1300)	-	-	-	-	-	-	-
3 THIRD COUNTRIES CONTRIBUTION (incl. EFTA and candidate countries)	-	-	-	-	-	-	-
- of which EFTA (Budget line 1200 - EFTA)	-	-	-	-	-	-	-
- of which Candidate Countries	-	-	-	-	-	-	-
4 OTHER CONTRIBUTIONS (Budget lines 2100 + 3100)	24.379.183	-	-	-	-	-	-
- of which delegation agreement, ad hoc grants	-	-	-	-	-	-	-
5 ADMINISTRATIVE OPERATIONS	-	-	-	-	-	-	-
6 REVENUES FROM SERVICES RENDERED AGAINST PAYMENT	-	-	-	-	-	-	-
7 CORRECTION OF BUDGETARY IMBALANCES	-	-	-	-	-	-	-
8 INTERESTS GENERATED	100.000	-	-	-	-	-	-
9 UNUSED APPROPRIATIONS FROM PREVIOUS YEARS (Budget line 5100)	9.209.232	1.954.260	-	-	- 1	-	-
<b>TOTAL REVENUES</b>	<b>36.935.761</b>	<b>1.954.260</b>	<b>-</b>	<b>-</b>		<b>-</b>	<b>-</b>

**Table 45: Detailed SESAR 1 Revenue Budget (financial contribution) over the period 2016 – 2020 (N-1 to N+3)**

- In 2016, EUR 500 000 are provided on budget line 06.027712
- In 2017, EUR 800 000 are provided on budget line 06.027717
- In 2018, EUR 10 million are provided on budget line 06.020103

The rationale for these amounts and the reference to the legal acts are provided in section II paragraph 3.2.2



## Detailed SJU Revenue Budget over the period – (N-1 to N+3)

REVENUES (in €)	N-1 (2016)	N (2017)	N+1 (2018)	N+1 (2018)	VAR N+1 / N	Envisaged N+2 (2019)	Envisaged N+3 (2020)
	Executed Budget	Revenues estimated by the agency	As requested by the agency	Budget Forecast			
1 REVENUE FROM FEES AND CHARGES							
2 EU CONTRIBUTION	60.500.000	100.800.000	120.000.000	120.000.000	19%	110.000.000	105.480.506
- of which Administrative (Title 1 and Title 2) (Budget line 1100)	-	3.241.507	3.250.683	3.250.683	0%	3.330.000	3.330.000
- of which Operational (Title 3) (Budget line 1200 - EU)	60.000.000	96.758.493	106.749.317	106.749.317	10%	106.670.000	102.150.506
- of which assigned revenues deriving from additional budget (Budget line 1300)	500.000	800.000	10.000.000	10.000.000	1150%	-	-
3 THIRD COUNTRIES CONTRIBUTION (incl. EFTA and candidate countries)	1.638.000	2.440.000	2.563.000	2.563.000	5%	2.563.000	2.457.696
- of which EFTA (Budget line 1200 - EFTA)	1.638.000	2.440.000	2.563.000	2.563.000	5%	2.563.000	2.457.696
- of which Candidate Countries							
4 OTHER CONTRIBUTIONS (Budget lines 2100 + 3100)	-	6.682.000	6.954.762	6.954.762	4%	6.954.762	6.954.762
- of which delegation agreement, ad hoc grants							
5 ADMINISTRATIVE OPERATIONS					-		
6 REVENUES FROM SERVICES RENDERED AGAINST PAYMENT							
7 CORRECTION OF BUDGETARY IMBALANCES							
8 INTERESTS GENERATED							
9 UNUSED APPROPRIATIONS FROM PREVIOUS YEARS (Budget line 5100)	-	1.470.005	23.920.200	23.920.200	1527%	- 1.470.005	- 3.024.368
<b>TOTAL REVENUES</b>	<b>62.138.000</b>	<b>111.392.005</b>	<b>153.437.961</b>	<b>153.437.961</b>		<b>118.047.757</b>	<b>111.868.595</b>

Table 46: Detailed SESAR 2020 Revenue Budget (financial contribution) over the period 2016 – 2020 (N-1 to N+3)<sup>50</sup>



Detailed breakdown of SJU SESAR 2020 Revenue Budget per Chapter:

**STATEMENT OF REVENUE***all figures in Euro*

<b>Title / Chapter</b>	<b>Programme estimates</b>	<b>Revenue Entitlements</b>				<b>Revenue</b>			
		<b>Budget 2015</b>	<b>Budget 2016</b>	<b>Budget 2017</b>	<b>Budget 2018</b>	<b>Budget 2015</b>	<b>Budget 2016</b>	<b>Budget 2017</b>	<b>Budget 2018</b>
<b>1. European Union Contribution</b>	<b>596.300.000</b>	<b>51.470.000</b>	<b>62.138.000</b>	<b>103.240.000</b>	<b>122.563.000</b>	<b>10.300.000</b>	<b>56.519.225</b>	<b>76.147.252</b>	<b>87.834.652</b>
1.1 H2020-ETFA Contribution to Administrative Expenditure	29.250.000			3.320.600	3.326.424			3.320.600	3.326.424
1.2 H2020-EFTA Contribution to Operational Expenditure	555.750.000	51.470.000	61.638.000	99.119.400	109.236.576	10.300.000	56.519.225	72.176.652	80.858.228
1.3 Com/EP Assigned Revenue	11.300.000		500.000	800.000	10.000.000			650.000	3.650.000
<b>2. Contribution from Eurocontrol</b>	<b>25.000.000</b>			<b>6.682.000</b>	<b>3.867.751</b>			<b>6.682.000</b>	<b>3.867.751</b>
2.1 Financial contribution	25.000.000			6.682.000	3.867.751			6.682.000	3.867.751
<b>3. Contributions from Other Members</b>	<b>40.658.499</b>			<b>1.470.005</b>	<b>27.007.210</b>			<b>1.470.005</b>	<b>28.211.523</b>
3.1 Financial contribution	40.658.499			1.470.005	27.007.210			1.470.005	28.211.523
<b>4. Other Revenue</b>									
4.1 Revenue From Interests Yielded									
4.2 Revenue From Taxes Recovered									
4.3 Programme revenues from non Members									
4.4 Exceptional Revenues - Decommittments									
4.5 Interest to be returned to the EU									
<b>Budget Outturn previous year</b>								<b>6.599.732</b>	<b>6.599.732</b>
<b>TOTAL REVENUE</b>	<b>661.958.499</b>	<b>51.470.000</b>	<b>62.138.000</b>	<b>111.392.005</b>	<b>153.437.961</b>	<b>10.300.000</b>	<b>56.519.225</b>	<b>90.898.989</b>	<b>119.913.926</b>

Table 47: Detailed breakdown of SJU Revenue Budget for SESAR 2020 per Chapter (N-2 – N+1)

**Table 3 – Budget Outturn and Cancellation of Appropriations**

Budget outturn	2014	2015	2016
Revenue actually received (+)	118.765.599	123 174 781	143 211 209
Payments made (-)	-97 328 996	-112 775 973	-102 973 228
Carry-over of appropriations (-)	-2 973 065	-3 027 976	-3 194 963
Cancellation of appropriations carried over (+)			
Adjustment for carry over of assigned revenue appropriations from previous year (+)			
Exchange rate differences (+/-)			
Adjustment for negative balance from previous year (-)			
<b>Total</b>	<b>18 463 538</b>	<b>7 370 832</b>	<b>37.043.018</b>

**Table 48: Budget Outturn and Cancellation of Appropriations**

\*N – the year covered by the programming document drafted in N-1

## Annex III: Human Resources (Tables) 2018 - 2020

Table 1 – Staff population and its evolution; Overview of all categories of staff

Staff population		Actually filled as of 31.12 N-2 (2015)	Authorised under EU budget N-1 (2016)	Actually filled as of 31.12.N-1 (31.12.2016)	Authorised under EU budget for year N (2017)	Budget for year N+1 (2018)	Envisaged in N+2 (2019)	Envisaged in N+3 (2020)
Officials	AD							
	AST							
	AST/SC							
TA	AD	32	33	32 <sup>51</sup>	33	33	33	33
	AST	6	6	6	6	6	6	6
	AST/SC							
Total		38	39	38	39	39	39	39
CA GFIV			2	2	2			
CA GF III				1 <sup>52</sup>				

<sup>51</sup> Recruitment procedure ongoing (Head of Budget & Finance - Ref. VN217)

<sup>52</sup> One contractual agent was hired to cover a temporary agent position on long term absence

CA GF II							
CA GFI							
Total CA	0	2	3	2		0	0
SNE	3	3	3	3	3	3	3
Structural service providers <sup>53</sup>	2	2	2	2	2	2	2
TOTAL	43	46	46	46	44	44	44
External staff for occasional replacement <sup>54</sup>	4	4	4	4	4	4	4

Table 49: Staff population and its evolution 2015 - 2020

<sup>53</sup> Service providers are contracted by a private company and carry out specialised outsourced tasks of horizontal/support nature, for instance in the area of information technology or reception services

<sup>54</sup> Replacement due to maternity leave, long term sick leave or unfilled positions

Table 2 – Multi-annual staff policy plan Year 2018 - 2020

Category and grade	Establishment plan in EU Budget N-1 (2016)		Filled as of 31/12/N-1 (31.12.2016)		Modifications in year N-1 in application of flexibility rule (2016)		Establishment plan in voted EU Budget N (2017) <sup>55</sup>		Modifications in year N in application of flexibility rule (2017)		Establishment plan in EU Budget N+1 (2018) <sup>56</sup>		Establishment plan N+2 (2019)		Establishment plan N+3 (2020)	
	officials	TA	officials	TA	officials	TA	officials	TA	officials	TA	officials	TA	officials	TA	officials	TA
AD 16																
AD 15							1				1		1			1
AD 14		1		1												
AD 13																
AD 12		4		3			4				4		4			4
AD 11							2				3		3			3
AD 10		5		4		-1	2		-1		2		2			2
AD 9				1		+1	3		+1		3		4			4

<sup>55</sup> The 2017 grades were adopted by the Budgetary Authority in the Amending Budget 3/2017. The amendment of the 2017 establishment plan of SESAR JU was necessary in order to allow for the reclassification of its Executive Director (from AD14 to AD15) upon mandate renewal (1 April 2017) following the favourable evaluation by the Administrative Board of the Joint Undertaking and the Commission. Moreover, a misalignment had occurred between the establishment plan of the SESAR JU and the grades. The Amending Budget 3/2017 realigns the establishment plan and grades. The overall budget and the total number of posts remain unchanged. The reclassification of the AD15 post is *ad personam* and will expire at the end of the mandate of the current Executive Director

<sup>56</sup> 2018 grades are subject to the adoption by the Budgetary Authority of the DB 2018 establishment plan of SESAR JU

Category and grade	Establishment plan in EU Budget (2016)		Filled as of 31/12/N-1 (31.12.2016)		Modifications in year N-1 in application of flexibility rule (2016)		Establishment plan in voted EU Budget (2017) <sup>55</sup>		Modifications in year N in application of flexibility rule (2017)		Establishment plan in EU Budget (2018) <sup>56</sup>		Establishment plan N+2 (2019)		Establishment plan N+3 (2020)	
	officials	TA	officials	TA	officials	TA	officials	TA	officials	TA	officials	TA	officials	TA	officials	TA
AD 8		5		4				6				6		6		6
AD 7		4		4		-1		5		-1		6		7		7
AD 6		4		5		+2		9		+1		7		6		6
AD 5		10		10		-1		1				1				
<b>Total AD</b>		<b>33</b>		<b>32</b>				<b>33</b>				<b>33</b>		<b>33</b>		<b>33</b>
AST 11																
AST 10																
AST 9												1		1		1
AST 8								1								
AST 7		1		1				1				1		1		1
AST 6																
AST 5		1		1												
AST 4								1				2		2		2
AST 3		2		2				2				1		1		1
AST 2														1		1



Category and grade	Establishment plan in EU Budget N-1 (2016)		Filled as of 31/12/N-1 (31.12.2016)		Modifications in year N-1 in application of flexibility rule (2016)		Establishment plan in voted EU Budget (2017) <sup>55</sup>		Modifications in year N in application of flexibility rule (2017)		Establishment plan in EU Budget N+1 (2018) <sup>56</sup>		Establishment plan N+2 (2019)		Establishment plan N+3 (2020)	
	officials	TA	officials	TA	officials	TA	officials	TA	officials	TA	officials	TA	officials	TA	officials	TA
AST 1		2		2				1				1				
Total AST		6		6				6				6		6		6
AST/SC1																
AST/SC2																
AST/SC3																
AST/SC4																
AST/SC5																
AST/SC6																
Total AST/SC		0		0				0				0		0		0
<b>TOTAL</b>		<b>39</b>		<b>38</b>				<b>39</b>				<b>39</b>		<b>39</b>		<b>39</b>

Table 50: Multi-annual staff policy plan Year 2018 - 2020

## Annex IV: Human Resources Policy

The main objective of the SJU staff policy is to define the necessary framework for the recruitment, equal treatment, organization, assessment, development and training of the SJU staff members so that their collective skills and competencies which constitute an asset for the SJU will contribute to the achievement of the SJU mission and specific objectives.

The SJU Staff Establishment Plan constitutes the document adopted by the Administrative Board defining the total number of positions by grade necessary to ensure the sound operational and financial management of the organisation and in order to execute its Work programme. These positions are filled in by personnel recruited under the following types of contracts:

- TAs contracts, for position requesting a long-term duration of the contract within the limit of the existence of the SJU such as for the Chief ATM, the Chief Economics and Master Planning as well as some administrative functions such as the Head of Finance and Budget Sector, the Financial Officer, etc.
- CAs contracts for some administrative support functions, where the TAs recruitment did not prove to be effective or for short term needs,
- SNEs where Member States' experience is requested.

### A. Recruitment Policy

As of the entry into force of Council Regulation (EC) 1361/2008, the Staff Regulations of Officials of the European Union, the Conditions of Employment of other servants of the European Union and the rules adopted jointly by the Institutions of the European Union for the purpose of applying these Staff Regulations and the Conditions of Employment shall apply to the staff of the Joint Undertaking and its Executive Director.

Following the Council Regulation (EU) 721/2014 amending the Council Regulation (EC) 1361/2008, the staff of the Joint Undertaking consists of TAs and CAs recruited for a fixed period that may be renewed once for a fixed period up to 5 years. Any other renewal shall be for an indefinite period in accordance with the EU staff Regulations. The total period of engagement shall not exceed in any case the duration of the Joint Undertaking.

The staff of the SJU shall consist of highly specialized technical staff members in charge of the management and implementation of the SESAR Programme and highly specialized and diversified administrative and financial staff to support the operations. In establishing the different job descriptions and the organization chart of the SJU, particular attention is paid to preserve the adequate separation of functions, to manage the risk of conflict of interest, to ensure an efficient and cost-effective functioning of the organization.

It has to be recognized that it is difficult to attract highly skilled persons on TA contracts for a limited duration, especially on technical activities where the SJU is in competition, on the recruitment point of view, with other entities such as EUROCONTROL.

#### 1. Staff categories

##### 1.1 Officials

The SJU has currently no post occupied by an official from an Institution. Furthermore, the SJU has no permanent posts on its establishment plan and, therefore, cannot appoint officials.

## 1.2 Temporary agents

On the basis of the missions and tasks set out by the SJU Regulation, the SJU considers that most of its existing workforce can be identified as positions of long term duration within the limits of the existence of the SJU, whether in core business activities for which continuous expertise needs to be built and maintained or support activities in the area of Finance and Administration.

Where the type of expertise requested for a certain position is not easily available on the free market and is retained by personnel working for one of its Members, the SJU fills in these highly specialized positions with secondments from its Members, ensuring that proper measures to manage potential conflict of interest are in place (segregation of duties, annual declarations on conflict of interest, etc.).

All temporary agent posts have been identified as post of long duration and are offered a 5-year contract (except for staff who were under Belgian contracts at 1 January 2009, in accordance with the transition provisions of Council Regulation (EC) 1361/2008, who are indefinite duration contracts still subject to the end of functioning of the SJU on 31 December 2024 at the latest).

The table under point 3 provides the information on the key functions for which the positions have been filled by TAs. The process followed is in compliance with the SJU Implementing Rules on the engagement and use of Temporary Staff.

The entry grades are determined in function of the level of the tasks to be performed and are those indicated in the staff establishment plan.

It should be noted that the SESAR Programme requires highly specialised skills and competencies, and – often – advanced seniority of staff members. The SJU grading approved by the Administrative Board reflects the need of highly specialised staff members to fulfil the duties of the management of a high level research programme.

The European Commission guidelines on Staff Policy describe the flexibility as regard to the recruitment grades in agencies.

As already mentioned and notwithstanding the Transitional Provisions laid down in article 2 of Council Regulation (EC) 1361/2008, temporary agents are recruited for a fixed term contract, in principle of 5 years, renewable once and for a fixed period up to 5 years. Any other renewal shall be for an indefinite period. In exceptional cases, the Appointing Authority could decide on a different duration of the contract. The total period of engagement will not exceed in any case the duration of the SJU (Article 2a of Council Regulation (EU) 721/2014).

## 1.3 Contract agents

Contract agents will serve the purpose of increasing capacity mainly in support functions (financial, legal or administrative).

In exceptional cases, the Appointing Authority could decide for the needs of the SJU to recruit a CA on a short term employment (to replace TA on maternity or parental leave, work overload, specific need).

Contract agents are recruited for a fixed term contract, usually with a duration not exceeding 3 years, renewable once for a fixed period. Any other renewal shall be for an indefinite period. In exceptional cases, the Appointing Authority could decide on a different duration of the contract. The total period

of engagement shall not in any case exceed the duration of the SJU (Article 2a of Council Regulation (EU)721/2014).

#### **1.4 Seconded national experts**

For the need of specific expertise, the SJU recruits SNEs from competent organisations in the EU or EUROCONTROL Member States, especially where expertise within Regulators or public authorities is requested.

#### **1.5 Structural service providers**

For the purpose of managing, plan and control reception services, the SJU has signed in 2011 a 1 year renewable contract with a service provider called “Receptel”. This service provider provides 1 to 2 FTE as receptionist/Back – office reception. It is not always the same person providing the services. In terms of ICT coordination, 1 person is provided by an external service provider.

#### **1.6 The Programme Support Office**

In 2008, EUROCONTROL established a Unit – the Project Support Office (PSO) – hosted by the SJU in order to provide the necessary support in the management of the SESAR Programme and consisting of a contribution in kind to the SJU. PSO provides programme management support to the SJU in strict coordination with the other SJU Teams. Under the current SJU-EUROCONTROL Agreement for the duration of the SESAR 2020 Programme, this Unit is known as PMU (Programme management Unit).The number of staff part engaged in this function at the end of 2016 is 19 persons.

The PMU staff assigned to the SJU for the execution of this Agreement shall remain subject to the EUROCONTROL’s staff regulations and rules.

#### **1.7 Seconded staff from SJU Selected Members**

At its meeting of 31 May 2017, the Administrative Board of the SJU, having regard to Articles 5(1)(p) and 8 of the Annex to the SJU Regulation and the SESAR Joint Undertaking Membership Agreement, which entered into force on 6 July and was signed by the SJU, EUROCONTROL and the SJU’s 19 Selected Members by virtue of Decision ADB(D)02-2016, decided:

- to adopt specific conditions on the secondment of staff of SJU Selected Members, as detailed in Annex 1 to the ADB (D)07-2017,
- to delegate the Executive Director to establish the necessary agreements in line with the aforementioned conditions.

The decision of the Administrative Board is also motivated by the nature of the SJU with its Selected Members as public-private partnership, where public and private resources are commingled for the achievement of objectives.

The secondment from the Selected Members constitutes a highly flexible mechanism to attract skilled experts, with contracts with specific duration and a low risk scheme.

In compliance with the Administrative Board decision, the SJU launches a Call for expression of interest to its Selected Members, to establish a list of potential candidates for specific positions.

The secondment to the SJU is subject to the signature of a secondment agreement that will complement the SJU Membership Agreement and detail the selected member’s contribution under the secondment.

Any secondment accepted by the SJU shall be considered as Additional Contribution in the meaning of Article 10.4 of the Membership Agreement and will be fully reimbursed under the conditions defined in Annex 1 to ADB Decision afore mentioned.

## 2. Staff Establishment Plan

At 31/12/2016, the Staff Establishment Plan of the SESAR JU is as follows:

Activity	Function / Job title	Contract Type/duration	Grade
Executive Director	Executive Director	TA fixed term + renewable	AD 14
TBD	TBD	TA fixed term + renewable	AD 12
Audit	Internal Audit Capability	TA fixed term + renewable	AD 6
Executive secretariat	Assistant to the Executive Director	TA indefinite (*)	AST 1
Corporate Affairs including corporate support and corporate quality, planning and reporting	Deputy Executive Director Corporate Affairs	TA indefinite (*)	AD 12
	Head of corporate support	TA indefinite (*)	AD 7
	Administrative assistant	TA indefinite (*)	AST 3
	Administrative assistant	TA fixed term + renewable	AST 1
	Head of Corporate quality, planning & reporting	TA fixed term + renewable	AD 8
	Corporate planning & reporting officer	TA fixed term + renewable (**)	AST 3
Strategies and relations with ICAO, follow up of MoC with third countries and communication	Chief Strategies & external Relations	TA indefinite (*)	AD 12
	Head of International Affairs	TA indefinite	AD 10
Relations with different stakeholders and coordination of ED activities	Head of stakeholders and institutional relations	TA fixed term + renewable	AD 10
Communication internal/external, media	Senior Communications & Media relations Officer	TA fixed term + renewable	AD 5
Implementation of the day-to-day communication strategy	Communications & Events officer	TA fixed term + renewable	AD 5
Development & delivery, Release and validation	Head of Release Management & Validation	TA fixed term + renewable	AD 7

	Release outcome manager & Environment officer	TA fixed term + renewable	AD 7
Development & delivery, development framework	Call Coordinator	TA fixed term + renewable	AD 9
	Grant Manager	TA fixed term + renewable	AD 6
	Grant Manager	TA fixed term + renewable	AD 6
	ATM Architecture Framework Expert	TA fixed term + renewable	AD 5
	ATM Performance expert	TA fixed term + renewable	AD 5
ATM	Chief ATM	TA fixed term + renewable	AD 10
	ATM Expert – Architecture & Systems Engineering	TA fixed term + renewable	AD 8
	ATM Expert - Airport & airspace user operations	TA fixed term + renewable	AD 6
	ATM Expert - TMA, En-route & network operations	TA fixed term + renewable	AD 6
	ATM Expert - CNS & Avionics	TA fixed term + renewable	AD 5
	ATM Expert - ATC & Airport Systems	Secondment from Member / 2 years (***)	NA
AU relations, business case, Master Planning	Chief Economist & Master planning	TA indefinite (*)	AD 10
General administration, Finance, legal and HR	Chief Administration Affairs	TA fixed term + renewable	AD 12
Project Audit	Project Auditor	TA fixed term + renewable	AD 5
Coordination of the Finance and Budget and responsibility for the follow-up of the SJU Budget	Head of Finance & Budget	TA fixed term + renewable	AD 8
Accounting	Deputy Accounting Officer	TA fixed term + renewable	AST 5
Financial administration	Financial Officer	TA indefinite	AD 6
Legal Affairs and Contract	Head of the Legal Affairs & Contract	TA indefinite (*)	AD 8
	Legal & Procurement Officer	TA fixed term + renewable	AD 5
Procurement procedures, personal data protection, day-to-day legal issues	Legal & Procurement Officer	TA fixed term + renewable	AD 5

HR Legal matters		HR Legal Officer and Data Protection Officer	TA fixed term + renewable (**)	AD 5
Recruitment, Administration, development	HR staff	HR Officer	TA indefinite (*)	AST 7

**Table 51: 39 positions of the Staff Establishment Plan per area (01/01/2017)**

(\*) Staff member eligible to Transitional Provisions Article 2 of Council Regulation (EC) 1361/2008 (8 staff)

(\*\*) Positions currently covered by a CA indefinite duration contract. These staff members are not additional to the 39 posts included in the Staff Establishment Plan approved by the Administrative Board of the SESAR Joint Undertaking, but they are contractual forms used by the SJU to fill in specific positions taking into consideration the needs and expertise requested. The same is applicable for the staff seconded by the Members to the SJU, in accordance with Article 8 of the SJU Statutes.

(\*\*\*) Position currently covered staff seconded by the Members to the SJU, in accordance with Article 8 of the SJU Statutes

### 3. Selection procedure

The described selection procedure is the one applicable to the SJU until the adoption by the SJU administrative Board of new implementing rules on the selection of temporary agents 2 f.

The SJU launches recruitment procedures for Temporary Agents through the announcement of vacant posts on its website and the EPSO website. The SJU may also recruit Contract Agents from the European Personnel Selection Office - EPSO's reserve lists, for the specific needs here above identified.

Generally vacancies are online for one month. During this time candidates can submit their applications. Exceptionally, this period may be extended. The exact deadline to apply for a job is indicated in each vacancy notice of the selection procedure that provides as well information on the job requirements and the conditions of employment. Candidates are requested to submit their application exclusively by means of a functional email address specific to each vacancy notice.

The SJU is an equal opportunity employer and strongly encourages applications from all candidates who fulfil the eligibility and requirements without any distinction on the grounds of nationality, age, race, gender, political, philosophical or religious conviction or sexual orientation and regardless of disabilities, marital status or other family situation.

Eligibility of candidates is assessed according to compliance with all formal requirements by the closing date for the submission of applications. Eligible candidates whose application shows evidence of all essential selection criteria described in the vacancy notice may be invited for an interview, which is held for the most part in English. During the selection process candidates may be required to undergo a competency assessment exercise.

Candidates invited to an interview are requested to submit, on the day of the interview, a copy of their diploma(s) and evidence of their professional experience, clearly indicating the starting and

finishing dates, the function(s) and the exact nature of the duties carried out. However, prior to contract signature, selected candidates are requested to provide SJU with original or certified copies of all relevant documents proving the eligibility requirements.

As a result of the interviews, the Selection Panel recommends the most suitable candidates for the post in question. The list of suitable candidates established by the Selection Panel may also be used for the recruitment for a similar post depending on the needs of the SJU. All candidates are informed by letter about the outcome of the selection procedure. Candidates are informed that inclusion on a reserve list does not guarantee recruitment.

Selection Panel's work and deliberations are strictly confidential and candidates are informed that any contact with its members is strictly forbidden.

The Executive Director, SJU AIPN, takes the final decision to offer the job to a selected candidate from the reserve list established by the selection panel.



## B. Appraisal of performance and reclassification/promotions

### Reclassification of temporary staff/promotion of officials

Category and grade	Staff in activity at 1.01.2015		How many staff members were promoted / reclassified in Year N-1 (2016)		Average number of years in grade of reclassified / promoted staff members
	officials	TA	Officials	TA	
AD 16					
AD 15					
AD 14		1			
AD 13					
AD 12		3			
AD 11					
AD 10		4			
AD 9		1			
AD 8		5		1	3
AD 7		3		1	3
AD 6		5			
AD 5		6		4	3
<b>Total AD</b>		<b>28</b>			
AST 11					
AST 10					
AST 9					
AST 8		1			
AST 7					
AST 6		1			
AST 5					
AST 4					
AST 3		1			

Category and grade	Staff in activity at 1.01.2015		How many staff members were promoted / reclassified in Year N-1 (2016)		Average number of years in grade of reclassified / promoted staff members
	officials	TA	Officials	TA	
AST 2		1		1	3
AST 1					
Total AST		4			
AST/SC1					
AST/SC2					
AST/SC3					
AST/SC4					
AST/SC5					
AST/SC6					
Total AST/SC					
Total		32		7	

Table 52: Reclassification of temporary staff/promotion of officials

## Reclassification of contract staff

Function Group	Grade	Staff in activity at 1.01.2014	How many staff members were reclassified in Year N-1 (2015)	Average number of years in grade of reclassified staff members
CA IV	18			
	17			
	16			
	15	1		
	14	1	1	4
	13	1		
CA III	12			
	11			
	10			
	9			

	8			
CA II	7			
	6			
	5			
	4			
CA I	3			
	2			
	1			
<b>Total</b>		<b>3</b>	<b>1</b>	<b>4</b>

**Table 53: Reclassification of contract staff**

Since 2012, an individual development review is launched at the beginning of the year for a given year, laying down the objectives and the performance of the staff member in relation to the Work Programme and the tasks related to the staff member's job description. A career Development Report (CDR) is carried out on the basis of the Appraisal guide that is published at the beginning of the exercise. Currently, all TA's and CA's are going through the annual appraisal of performance as described in the ADB Decision 04-2012 of 29 March 2012.

### C. Gender and geographical balance

Since its establishment, the SJU has ensured equal opportunities for staff and has done its best to attract specialised technical staff of the highest calibre. The equal opportunities policy is applied to recruitments in order to secure gender and geographical balance in a domain of operations that appears to be highly unbalanced.

Geographical balance is regularly sought in accordance to Article 27 of the Staff Regulations and 12 and 82(1) of the Conditions of Employment of Other Servants; bearing in mind the small size of the SJU, that search for the best qualified staff for the vacant post will be the first priority.

To date, the SJU has not noted any significant gender and geographical imbalance in its staff. At 31/12/2016, the Establishment Plan (i.e. including TAs and CAs) is as follows:

Nationalities	#	Of which women
Belgium	6	4
Bulgaria	1	0
France	4	2
Greece	1	1
Germany	1	0
Italy	5	3
Ireland	2	2

Lithuania	1	1
Netherlands	3	2
Portugal	2	2
Romania	1	0
Spain	6	4
Sweden	1	0
UK	5	1
<b>TOTAL</b>	<b>38</b>	<b>22</b>

Table 54: Gender and geographical balance

Gender/Grade	Male	Female	Total
AD	15	16	31
AST	1	6	7
<b>Total</b>	<b>16</b>	<b>22</b>	<b>38</b>
AD	40%	42%	82%
AST	2%	16%	18%
<b>Total</b>	<b>42%</b>	<b>58%</b>	<b>100%</b>

Table 55: Grade vs. gender balance (excluding 3 Seconded National Experts)

## **D. Mobility policy (internal mobility, between EU Bodies and between EU Bodies and the institutions)**

### **1. Mobility within the SJU**

Vacancy notices are accessible internally as well as externally and staff members are always given the opportunity to apply.

### **2. Mobility among EU Bodies**

The SJU was previously excluded from the possibility for its staff to benefit of mobility between the agencies, limiting substantially one of the key elements of the career development of its staff. It is expected that this situation will change with the adoption in April 2016 of new implementing rules on the selection of temporary agents 2f under the new Staff Regulations.

### **3. Mobility between the SJU and the Institutions**

The SJU has currently no post occupied by an official from an Institution<sup>57</sup>; nevertheless where appropriate the SJU can consider favouring mobility with the Institutions.

## **E. Schooling**

European Schools in Brussels should cover the SJU staff needs in this respect, for the staff currently eligible.

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<sup>57</sup> There is 1 temporary agent (Liaison Officer) who is in secondment from the European Commission in its own interest respectively for 4 years.

## Annex V: Buildings (table)

The SJU has already established its location in Brussels through the rental of suitable office accommodation and ancillary space secured for the duration of the extended SJU. There is no plan to acquire any property or buildings in the future.

Current building(s)

	Name, location and type of building	Other Comment
Information to be provided per building:	Avenue de Cortenbergh 100 – 1000 Brussels	Joint occupancy building with non-EU bodies.
Surface Area (m2)	1828	
Surface Area (m2): Office space	1765	
Surface Area (m2): Non-Office space	63	There are an additional 28 Car Parking Spaces (not measured in surface area)
Annual rent (in EUR)	427 925	Excluding gratuities and other reductions
Type and duration of rental contract	9 year lease from 2016	With Diplomatic Clause for rupture of rental contract with 6 months' notice.
Host country grant or support	N/A	
Present value of the building	N/A	

**Table 56: Buildings**

- Building projects in planning phase: n/a
- Building projects submitted to the European Parliament and the Council: n/a

## Annex VI: Privileges and Immunities (table)

Agency privileges	Privileges granted to staff	
	Protocol of privileges and immunities / diplomatic status	Education / day care
VAT exemption as of 16.10.2008, Administrative Agreement with the Belgian Authorities since 30.03.2009	Protocol of Privileges and Immunities applicable to staff with regard to VAT.	N/A

## Annex VII: Evaluations

The SJU has been subject to a mid-term evaluation in 2014 initiated by the DG MOVE.

The purpose of the evaluation was to assess the functioning of the SJU from January 2010 to December 2012, as required by the SJU Regulation.

This second mid-term evaluation concluded that the SJU carried out the tasks assigned to it during the evaluation period (2010-2012). The organisation operated effectively, thus contributing to the objectives of the SESAR Programme. The SJU has also proven to be a structure that can adapt to specific needs and changes, while still operating under the rules and procedures governing it. Finally, the SJU complied with the principles of sound financial management. It was also found that the SJU took the recommendations of the first midterm evaluation into account and addressed them adequately during the period 2010-2012.

The evaluation resulted in two recommendations; one for the working methods of the SJU, and one for the results obtained by the SJU. Both have been followed up by SJU management.

In 2017, the SJU was subject to two evaluations: the final evaluation of SESAR 1 and the interim evaluation of SESAR 2020.

The former concerned the closure of the SESAR 1 Programme (2007-2016), while the latter focused on the ongoing research activities under the SESAR 2020 Programme (2014-2020). Overall, the SESAR JU managed to complete over 300 projects, 350 validation exercises leading to 63 SESAR Solutions which are currently being deployed in EU in order to maintain high safety levels and improve cost and environmental efficiency of air traffic management in Europe.

The reports are based on the work of independent experts and the results of a stakeholder consultation. They clearly show that SESAR, which has already been active for 10 years, is delivering on its objectives, helping to overcome fragmentation and create continuity of research goals. The commitment of the members is evident and there are high expectations for its outputs. At the same time, the evaluation reports outline a series of elements on which the future work of SESAR should focus upon.

The final reports as well as a EC Staff Working Document on the evaluations of the 7 JUs can be found online via the following links:

- [https://ec.europa.eu/transport/transport-modes/news/2017-10-10-transport-join-undertakings-are-delivering-expected-results\\_en](https://ec.europa.eu/transport/transport-modes/news/2017-10-10-transport-join-undertakings-are-delivering-expected-results_en),
- [http://ec.europa.eu/research/evaluations/index\\_en.cfm?pg=h2020evaluation](http://ec.europa.eu/research/evaluations/index_en.cfm?pg=h2020evaluation).





## Annex VIII: Risk Management in 2018

During 2017, following an audit from the IAS, the previous Risk Management Policy has been entirely revisited to be better aligned with the specificities of the SESAR 2020 programme. In February 2017, the SJU Executive Director adopted the new “SJU Risk Management Policy” (SJU/ED/613). This decision repeals the “Internal Control Framework and Risk Management Policy” (SJU/ED/ 64). and the "Risk, Issue and Opportunity Management Process" (SJU/ED/305) both applicable at the time of the audit. The policy addresses 4 threads of risks: Corporate risks, Master Plan risks, SJU internal risks and SESAR 2020 Programme Risks. In addition to this new Risk Management Policy, in May 2017, the SJU formalised in the context of its Quality Management Process, “the Corporate Risk Management Process” (SJU Business Process nr 14.2).

The revised SESAR JU Corporate Risk Management better integrates the bottom-up approach with the top-down approach. Indeed, the bottom-up approach comprises the risk management performed by SESAR 2020 participants who identify and manage risks at project level while Programme Managers are in charge of identifying and monitoring the critical risks at the programme level. The top-down approach consists in an analysis of risks linked to strategic objectives.

Care has been taken to streamline the current approach to reduce disproportionate requirements and to increase the focus on the management of **critical risks** defined as a risk that:

- endanger the realisation of objectives outlined in the European ATM Master Plan;
- cause serious damage to the SESAR partners (SJU Members, broader stakeholder community involved in the execution of the European ATM Master Plan)
- result in critical intervention at political level (Commission/Council/Parliament) regarding SJU’s performance;
- result in infringement of laws and regulations;
- result in misuse of public money;
- put the safety levels of aviation at stake;
- or in any way seriously impact the SJU’s image and reputation.

Risk #	Risk Description	Consequences and impacts	Affected 2018 objectives	Criticality (current)	Risk Owner	Summary of Response Actions
1	The R&D Programme does not deliver solutions that are ready for preparation for deployment	<ul style="list-style-type: none"> <li>- Delay to deployment plans relate to SESAR R&amp;D results</li> <li>- Performance ambition is not met</li> </ul>	<ul style="list-style-type: none"> <li>Finalise validation exercises of Release 7</li> <li>Execute validation exercises of Release 8</li> <li>Prepare ER4, Wave 2 and VLD Open 2 Calls for proposal for launch in 2019</li> </ul>	High	SJU	<ul style="list-style-type: none"> <li>- Ensure consistency between the expectations outlined in the Master Plan and the delivery of SESAR Solutions in terms of time and scope</li> <li>- Deliver and publish SESAR Solutions Packs to prepare deployment of the SESAR 1 R&amp;D results beyond the PCP</li> </ul>
2	Ineffective bridging between development and deployment activities may put industrialization at risk and delay deployment	<ul style="list-style-type: none"> <li>- Delays and lack of harmonization in deployment</li> <li>- Performance ambition not met</li> <li>- Compromise to the delivery of enhanced performance due to reliance on the “workarounds” to secure regulatory approval</li> <li>- The full scope of industrialization may be missed, omitting certain stakeholder needs</li> </ul>	<ul style="list-style-type: none"> <li>Call reference H2020-SESAR-2015-2 (IR –VLD Wave 1 Call): Wave 1 projects delivery of results</li> <li>Strengthen links towards Standard Making Organisations like EUROCAE, RTCA etc. with the involvement of SESAR members and the availability of SESAR material in support of standardisation</li> <li>Strengthen dissemination of SESAR Solutions/demonstrations through SESAR publications, communications events</li> <li>Strengthen coordination with relevant Master Plan stakeholders</li> <li>Provide support to EC on other areas linked to the technological pillar of the SES</li> </ul>	High	EC, SJU, SDM, Standardization Bodies	<ul style="list-style-type: none"> <li>- Launch and execute first wave of SESAR Very Large Scale Demonstration activities to bridge R&amp;D with deployment</li> <li>- Further strengthen cooperation arrangements with standardization bodies to ensure alignment of their respective work programmes with the needs identified in the ATM MP</li> <li>- Strengthen current engagement of the regulatory authorities in the development and prepare for deployment</li> <li>- Begin preparation of IR Wave 2 VLD projects for launch in 2019</li> </ul>
3	Interoperability and global harmonisation are not ensured	<ul style="list-style-type: none"> <li>-Global modernisation programmes are not aligned</li> <li>- Reworking required, resulting in delays and</li> </ul>	<ul style="list-style-type: none"> <li>Strengthen links towards Standard Making Organisations like EUROCAE, RTCA etc. with the involvement of SESAR members and the availability of SESAR material in support of</li> </ul>	High	EC, SJU	<ul style="list-style-type: none"> <li>- Work towards global interoperability in the framework of ICAO working arrangements and in view of the GANP update</li> <li>- Continue to strengthen SESAR/NextGen coordination under the EU/US MoC with</li> </ul>

Risk #	Risk Description	Consequences and impacts	Affected 2018 objectives	Criticality (current)	Risk Owner	Summary of Response Actions
		<p>additional costs</p> <ul style="list-style-type: none"> <li>- Basis for sound investment decision-making is not established</li> </ul>	<p>standardisation</p> <p>Active cooperative arrangement with all European (Member States and Regions), International actors and other modernisation initiatives in Aviation relating to SESAR Definition and Development</p>			<p>particular focus on securing further alignment between the Master Plan and the NextGen Implementation Plan.</p>
4	Delays in the implementation of the Pilot Common Project (PCP)	<ul style="list-style-type: none"> <li>-Insufficient commitment for the deployment phase</li> <li>-Delay/de-synchronization of deployment plans</li> <li>- Performance ambition not met</li> <li>- Negative impact on EU economy, employment, mobility and the environment</li> </ul>	<p>Strengthen coordination with relevant Master Plan stakeholders</p> <p>Provide support to EC on other areas linked to the technological pillar of the SES</p>	High	EC, SDM, all stakeholders	<ul style="list-style-type: none"> <li>- Coordinate deployment to ensure timely and synchronized deployment of the PCP</li> </ul>
5	Investments to support deployment beyond 2020 are not secured	<ul style="list-style-type: none"> <li>- Performance ambition not met.</li> <li>- Insufficient commitment, financial resources and investment for the deployment phase.</li> <li>- Delay/de-synchronisation of deployment</li> <li>-Severe negative impact on</li> </ul>	<p>Execute the Master Plan Update Campaign</p> <p>Provide support to EC on other areas linked to the technological pillar of the SES</p>	High	EC, SJU, SDM	<ul style="list-style-type: none"> <li>- Prepare for the deployment of SESAR 1 results beyond the PCP (Business Cases, impact assessments, future common projects when appropriate).</li> <li>- Ensure that financial and operational incentive mechanisms are defined and implemented in a timely manner in order to facilitate the deployment of SESAR.</li> <li>- Ensure consistency between the stakeholder roadmaps in the ATM MP and</li> </ul>

Risk #	Risk Description	Consequences and impacts	Affected 2018 objectives	Criticality (current)	Risk Owner	Summary of Response Actions
		EU economy				stakeholder’s investment plans.  - Deliver macro-economic impact assessment as part of the Master Plan update 2018
6	SESAR programme does not sufficiently address R&D needs to ensure the integration of all vehicles as identified in the ATM Master Plan (notably GA, rotorcraft and drones)	- Negative impact on EU economy, employment, and mobility  - Lost opportunity for EU	Execute the Master Plan Update Campaign  Strengthen coordination with relevant Master Plan stakeholders  Provide support to EC on other areas linked to the technological pillar of the SES  Active cooperative arrangement with all European (Member States and Regions), International actors and other modernisation initiatives in Aviation relating to SESAR Definition and Development  Execute validation exercises of Release 8	High	EC, SJU	- Include 2017 specific MP update on drones in the MP Ed. 2018 for integration of all types of drones in all classes of airspace  - Secure appropriate funding for required R&D activities  - Strengthen cooperation with FAA and NASA on the Very Low drones Operations, also called U-space

Table 57: Main SJU risks and related actions



## Annex IX: Procurement plan for 2018

Article 84(2) of the EU Financial Regulation states that: “Except in the case of appropriations which can be implemented without a basic act in accordance with point (e) of the first subparagraph of Article 54(2), the commitment of expenditure shall be preceded by a financing decision adopted by the institution or the authorities to which powers have been delegated by the institution”.

Article 94 of Commission Delegated Regulation (EU) No 1268/2012 of 29 October 2012 on the rules of application of Regulation (EU, Euratom) No 966/2012 of the European Parliament and of the Council on the financial rules applicable to the general budget of the Union (hereinafter referred to as “the Rules of Application” or “RAP”), states under paragraph 2, that the financing decision shall in particular set out certain essential elements for an action involving the expenditure from the budget for grants and for procurement. In addition under paragraph 3 it is stated that the work programme which contains the information set out in paragraph 2 shall be considered to be the financing decision for grants and procurement.

Founding Members



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Approved

REF	Procurement description	Explanation / Rationale	Target launch date	Target signature date	Total est. budget (EUR)	Type of contract / procedure	Comments
<b>Strategic Area of Operation #1 – Provide Strategic Steering</b>							
	Airspace architecture study	Develop a proposal for the future architecture of the European airspace, in response to mandate expected from the Commission in September 2017	Q1 2018	Q1 2018	Estimated at 760 000	Open Call for tender or Specific order under Framework Contract	As per Delegation Agreement signed between the SJU and the Commission on 06/12/2017
	Strategic advice	Support for the Master Plan update campaign (see section III paragraph 2.1.3)	Q1 2018	Q2 2018	500 000	Specific order under Framework Contract	
	Strategy advice	Support to the SJU on strategic matters	Q3 2018	Q4 2018	Estimated at max. 1 000 000 <sup>58</sup> in total	Open Call(s) for Tender or Framework Contract	One or several procurement actions
	Project Audit	Assessment of Interim Financial Statements 2016	Q2 2018	Q3 2018	500 000	Specific Contract under SJU Framework Contract	
	Critical analysis study of the current European Infrastructure	Follow-up of the CP2 proposal on CNS rationalisation	Q1 2018	Q2 2018	500 000	Open Call for tender – Service contract	
	Generic expert support	Expert contract for provision of generic support	Over 2018	Over 2018	300 000	Expert support	Support provided for evaluation and deliverables generated under H2020, CEF and other grant/procurement procedures
	Programme Management Support	New Framework contract. current contracts ending respectively in Q3 2018 Budget consumed at 100% on current framework contract as from Q1 2018	Q2 2018	Q3 2018	To be defined	Open Call for Tender - SJU Framework Contract	

<sup>58</sup> Latest estimate at end 2017, to be confirmed in 2018



Civil Airspace Users advice services to support SESAR 2020 activities	Implementation of FWC for 2018 <ul style="list-style-type: none"> <li>• Lot 1 European scheduled aviation: current SC expiring on 31/08/2018</li> <li>• Lot 2 Global airlines operations focusing on inter ICAO regions business and operational interoperability: no SC signed for 2018</li> <li>• Lot 3 Business aviation operations: current SC expiring on 31/08/2018</li> <li>• Lot 4 General aviation and rotorcraft operations: current SC expiring on 31/08/2018</li> </ul>	Q1 2018	Q1 2018	Estimated to a max. total of 2 325 000	Specific Contracts under SJU Framework Contracts	Number of specific contracts to be determined in 2018
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<b>Strategic Area of Operation #5 – Deliver SESAR Outreach</b>						
Airport Expertise	Specific Contract for 2019	Q3 2018	Q4 2018	200 000	Specific Contract under SJU Framework Contract	
Professional Staff Associations	Specific Contract for 2018	Q4 2017	Q1 2018	167 000	Specific Contract under SJU Framework Contract	5 Specific Contracts corresponding to each lot of activities
Events support	See section II paragraph 2.5.1	Q1 2018 - Q3 2018	Q1 2018 - Q3 2018	166 736	Specific Contracts under SJU Framework Contract	3 Specific Contracts planned
Communications support for Strategic communication	See section II paragraph 2.5.1	Q1 2018 – Q2 2018	Q1 2018 – Q2 2018	116 552	Specific Contracts under SJU Framework Contract	3 Specific Contracts planned
Event support	FWC Lot 3 SC7	Q1 2018	Q1 2018	100 000	Specific Contract under SJU Framework Contract	
Digital Communications	SC 4 Lot2	Q1 2018	Q1 2018	45 000	Specific Contract under SJU Framework Contract	
Digital Communications	SC 5 Lot2	Q2 2017	Q2 2018	20 000	Specific Contract under SJU Framework Contract	
Events support	Service agreement with EUROCONTROL	Q1 2018	Q1 2018	40 000	Service agreement with EUROCONTROL	
Communications support for graphical design	Service Level Agreement	Q1 2018	Q1 2018	20 000	SLA with EU office of publication (existing)	
Small procurements for Communication services and events	Low value – small procurement (purchase orders)	Q1 2018-Q4 2018	Q1-Q4 2018	10 000	Negotiated procedure with a single tender - Article 137(2) RAP	Low value procedure



**Strategic Area of Operation #6 – Deliver effective financial, administrative and corporate management**

Security audit of SJU premises	LSO obligation to carry out checks on compliance with the relevant security rules and Security Notices	Q1 2018	Q1 2018	20.000	Direct Service Contract - Open Call for Tender	New Call for tender Studies should be available no later than May 2018, following DPO recommendations
Security Systems Compliance & Upgrade	Implementation of Security Systems Compliance & Upgrade CTR-327	2018	2018	10 000	Implementation of Security Systems Compliance & Upgrade CTR-327	Depending on the Security Alerts and Audit report
Optimal surveillance network		Q3 2018	Q1 2019		Open Call for Tender - Direct Service Contract	
Supply of high level consultancy and studies	Procurement of benchmarking and delivery quality review services	Q1 2018	Q4 2018	250.000	Specific Contracts under EC Framework Contract Or SJU CFT	1 or several actions planned under ABC IV Lot 2 benchmarking and delivery quality review services and ABC IV Lot 3 high level consultancy and studies
Microsoft high level services for Quality Management	MS Inter-Institutional contracts for MS services, replacing EC FC DI07300 used at the SJU – maintenance contract and advisory in Document Management	Q1 2018	Q2 2018	120 000	Specific Contract under EC Framework Contract	DIGIT/A#/PN2017041 & DIGIT/A#/PN2017040 New FC replacing DI07300
Supply of Advice and Benchmarking services	Procurement of benchmarking and delivery quality review services	Q1 2018	Q2 2018	50.000	Specific Contract under EC Framework Contract	ABC IV Lot 1 and Lot 2 benchmarking and delivery quality review services
MS Inter-Institutional contracts for MS products (acquisition & maintenance), replacing EC FC DI07280 used at the SJU	MS products, services and networks licensing to SJU and maintenance	Q1 2018	Q2 2018	20.000	Specific Contract under EC Framework Contract	Depending on the date of signature of the new EC FWC (currently DIGIT/A#/PN2017041 & DIGIT/A#/PN2017040)

Licenses	Maintenance renewal of Adobe licences VMWare licences	Q3 2018	Q4 2018	13 000	Specific Contract (actually Purchase Order Adobe maintenance) based on EC Framework Contract DI07360	A minimum of 2 Actions SIDE contract with Comparex
Microsoft - Licensing Solutions Partners (LSP)	Microsoft - Licensing Solutions Partners (LSP)	Q1 2018	Q2 2018	20 000	Specific Contract (actually Purchase Order Adobe maintenance) based on FWC (Comparex) DI07470	LSP contract with Comparex
Supply of ICT Testing & Validation activities	Procurement of high level consultancy and studies in the field of ICT	Q1 2018	Q2 2018	25 000	Specific Contract under EC Framework Contract	
Supply, installation and replacement of office equipment	Supply, installation and replacement of office equipment	Q2 2018	Q3 2018	50 195	Specific Contract under EC Framework Contract	A minimum of 3 Specific Contracts under the following Framework Contracts :  <ul style="list-style-type: none"> <li>• Lot 1 - Poste de travail/ executant - EU FWC OIB.DR.2/PO/2014/055/622/C0 /L1A</li> <li>• Lot 2 - Poste de travail/ direction - EU FWC OIB.DR.2/PO/2014/055/622/C0 /L2A</li> <li>• Lot 3 - Siege - EU FWC OIB.DR.2/PO/2014/055/622/C0 /L3A</li> </ul>
Supply, installation and replacement of kitchen and cafeteria/ reception equipment	Supply, installation and replacement of kitchen equipment	Q4 2018	Q1 2019	10 000	Specific Contract under EC Framework Contract	EC FWC OIB-PN-2016-000086 EC FWC OIB-PN-2016-000087
Cleaning services, Facilities improvement & Maintenance	current contract expiring on 04/04/2018	Q4 2017	Q1 2018	180 000	Specific Contracts under SJU Framework Contract	Lot 1 Cleaning Services Amount applies for a 4-year period (2018, 2019, 2020 and 2021)
Cleaning services, Facilities improvement &	current contract expiring on 04/04/2018	Q4 2017	Q1 2018	165 000	Open Call for tender – Service contract	A minimum of 2 actions Lot 2 Facility Services for

Maintenance						Maintenance and Renovation Lot 3 Replacement and installation of carpet flooring Amount applies for a 4-year period (2018, 2019, 2020 and 2021)
Reception services	End date of the current contract (SJU/LC/302-CTR) is 01/06/2019 but due to early exemption of budget need to place new contract in Q4 2018	Q4 2018	Q1 2019	580 000	Open Call for tender – Service contract	Reception services front & back office Amount applies for a 4-year period (2018, 2019, 2020 and 2021)
Travel Agency Services	Renewal of SC under EC Framework Contract Price includes transaction fees, OBT Set-up & Maintenance fees	Q2 2018	Q3 2018	100 000	Specific Contracts under SJU Framework Contract	Interinstitutional (Framework) Contract PMO02/PR/2013/001 – Travel agency services Amount applies for a 4-year period (2018, 2019, 2020 and 2021)

**Table 58: Main procurement activities to be conducted in 2018**

Note: In accordance with Art. 94 (4) RAP and the principle of sound financial management, the SJU Authorising Officer may decide to make non-substantial changes and amend the indicative budget and/or timing identified above for a given procurement procedure if this allows for an improved adherence to SJU objectives. A change of more than 20 % in the volume of appropriations, introduction of a new action or other changes affecting the political choices in the SPD are to be considered as substantial.

## Annex X: 2016 SJU Organisation Chart

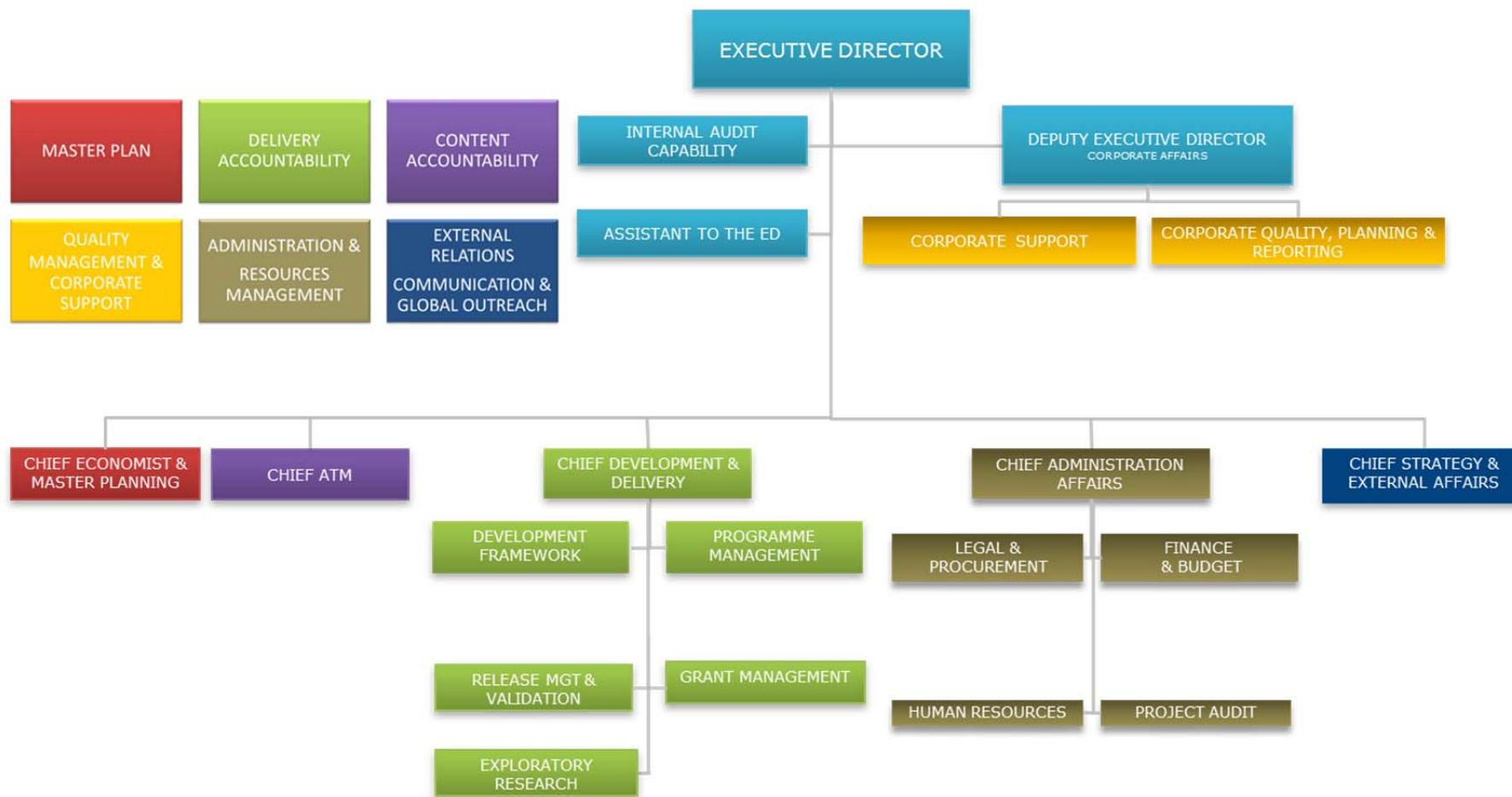


Figure 16: SESAR JU Organisation chart as at 31/12/2016

## Annex XI: List of Members of the SESAR Joint Undertaking

The SJU Members and their respective constituent entities are listed below:

	Name of Member	Constituent Entities	Country
1.	The European Union, represented by the European Commission (Founding Member)		
2.	EUROCONTROL, the European Organisation for the Safety of Air Navigation, represented by its Agency (Founding Member)	Single Entity	
3.	Airbus SAS	Single Entity	FR
4.	AT-One Consortium	a) Deutsches Zentrum für Luft- und Raumfahrt e. V. (German Aerospace Center, DLR)	DE
		b) Stichting Nationaal Lucht- en Ruimtevaartlaboratorium (National Aerospace Centre, NLR)	NL
5.	B4 Consortium	a) POLSKA AGENCJA ŻEGLUGI POWIETRZNEJ, the Polish Air Navigation Services Agency: (PANSa)	PL
		b) RIZENI LETOVEHO PROVOZU CESKE REPUBLIKY STATNI PODNIK, the Air Navigation Services of the Czech Republic: (ANS CR)	CZ
		c) Letové prevádzkové služby Slovenskej republiky, štátny podnik: (LPS SR s.p.) – State owned ANSP of Slovakia	SK
		d) Valstybes imone "Oro navigacija", the State Enterprise "Oro Navigacija" (ON) – State owned ANSP of Lithuania	LT
6.	COOPANS Consortium	a) Naviair	DK
		b) Irish Aviation Authority: (IAA)	IE
		c) Croatia Control, Croatian Air Navigation Services Ltd: (CCL)	HR
		d) Austro Control Österreichische Gesellschaft für Zivilluftfahrt mbH: (ACG)	AT
		e) Luftfartsverket: (LFV).	SE
7.	Dassault Aviation SA	Single Entity.	FR
8.	DFS Deutsche Flugsicherung GmbH: (DFS)	Single Entity.	DE
9.	République Française, Ministère de L'écologie, du Développement Durable, et de L'Énergie, acting via Direction Générale de L'Aviation civile, represented by Direction des Services de la Navigation Aérienne: (DSNA).	Single Entity.	FR
10	ENAV S.p.A	Single Entity.	IT
11	Entidad Pública Empresarial ENAIRE	Single Entity.	ES
12	Finmeccanica S.p.A.	Single Entity.	IT
13	Frequentis SESAR Partners (Consortium)	a) Frequentis AG	AT
		b) Hungarocontrol Zrt (HC)	HU

		c) Atos Belgium SA/NV.	BE
14	Honeywell Aerospace SAS	Single Entity.	FR
15	INDRA Sistemas, S.A.	Single Entity.	ES
16	NATS (En Route) Plc	Single Entity.	GB
17	North European ATM Industry Group NATMIG Consortium	a) Stiftelsen SINTEF	NO
		b) Saab AB	SE
		c) Airtel ATN Ltd.	IE
18	SESAR European Airports Consortium (SEAC 2020)	a) Heathrow Airport Limited	GB
		b) Aéroports de Paris S.A.	FR
		c) Flughafen München GmbH	DE
		d) Flughafen Zürich AG	CH
		e) Schiphol Nederland B.V.	NL
		f) Swedavia AB	SE
		g) Avinor AS.	NO
19	Skyguide, Swiss civil and military Air Navigation Services Ltd	Single Entity	CH
20	Thales Air Systems SAS	Single Entity	FR
21	Thales Avionics SAS	Single Entity	FR

**Table 59: List of SJU Members**